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OBJECTIONS TO THE ANTIVIVISECTION BILL NOW BEFORE THE SENATE OF THE UNITED STATES.

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The following statement has been prepared by the writer in order to meet the requests of several Senators of the United States and of physicians for objections to Senate bill 1063, which has been reported unanimously by the Committee on the District of Columbia. It is believed that many have been misled by efforts of advocates of the proposed legislation to make it appear that the bill is intended only to check alleged abuses of animal experimentation and not to interfere with its proper uses. A main purpose of this statement is to show the error of this assumption.[1] Much of the same ground has already been covered by others in various protests and publications.

The provisions of Senate Bill 1063 are so complicated and in several instances doubtful in their interpretation, and the objections to the bill are so numerous and their full presentation would require so much space, that only some of the principal arguments against it can be considered within the compass of this succinct statement.

1. The bill is entitled "A Bill for the further prevention of cruelty to animals in the District of Columbia." This title is misleading, as it does not indicate that the bill is intended solely for the restriction and regulation of experiments upon animals. The recommendation of the Commissioners of the District of Columbia in their report upon a bill of the same title and of similar contents in the 54th Congress (S. 1552) that the title be changed to read "A Bill to regulate vivisection in the District of Columbia" was not adopted. It may well be questioned whether some who have signed petitions in favor of the bill have not been misled by the title as to the real contents of the bill.

2. The authorship of this bill is claimed by the antivivisection committee of the Washington Humane Society (annual report, 1895, p. 24). The attitude of this society toward experimentation upon animals is apparent in the report of its president for the year 1894, where he said: "The subject of vivisection (experiments upon animals) has been frequently before your executive committee during the past year, and but one sentiment has been expressed, viz., that of utter abhorrence and condemnation of the inhuman practice which, according to the oft expressed opinion of the best physicians and surgeons, is of no practical value to science or medicine." It should be borne in mind that this bill emanates wholly from those hostile to animal experimentation and who, as appears from the foregoing quotation, do not hesitate to misstate the opinion of the great body of the medical profession as to the value of animal experiments. No one familiar with the needs of scientific and practical medicine and of biological science and possessing skilled knowledge upon the subjects which the bill proposes to regulate has been consulted or had any hand in the drafting of the bill.

3. Medical and scientific men have never had adequate opportunity to present the arguments against this bill before the Committee on the District of Columbia, which has reported favorably upon it. At the hearing of a similar bill before this Committee on April 17, 1896, Surgeon-General Sternberg said, "We did not know of this hearing until today, and were compelled to come here without any previous preparation." Surely a bill which is of far more than local interest, as appears from the numerous communications regarding it from all parts of the country, and which in its direct and remote bearings, in the opinion of enlightened physicians and scientists, vitally concerns the future progress of medicine and biological science in this country, never should have been reported by the Committee without thorough investigation as to its necessity and its effects and without full opportunity, granted not only to physicians of the District of Columbia but to others, to prepare and submit arguments against it. An hour's time granted to a few hastily summoned physicians and scientific men of the District, who came without preparation, did not afford the requisite opportunity to present adequately the objections to the bill.

4. Any one who is at all familiar with the writings and the propaganda of the antivivisectionists knows that their ultimate aim is to abolish animal experimentation altogether. They demand only such measure of restrictive legislation in the present bill as they think they may be able to secure at the present time. Concession to these demands will not check their agitation of the subject and their efforts to secure more stringent laws, as has been abundantly

[1] As a matter of fact no abuse of vivisection such as would justify any restrictive law whatever has been demonstrated in this country. The experience in England has shown the folly of the belief of some men of science and physicians that any compromise in this matter with antivivisectionists will check in the least their agitation of the subject. Upon this point I will quote, by permission, a few sentences from a private letter written by Michael Foster, who is recognized in this country as well as in Great Britain as the leader in his department of medical science. The letter was written to a prominent physiologist in this country: "I have always said and always shall say that the necessity of a restrictive law has never been shown. The English Commission failed to demonstrate any abuse such as could justify the measures adopted; and from what I know of America and Americans I am confident no such laws are needed with you. Indeed, my objections to the Act as a politician are quite as strong as my objections as a physiologist; the Act is stamped with that mark of bad statemanship, *meddlesomeness*. . . . . If the time were to come over again, I should fight tooth and nail against any act at all, on the ground that all such *legislative restrictions are unnecessary*, that instances of cruelty, that is of needless causing of pain on the part of physiologists are, to say the least, rare, and that public opinion aided by the ordinary law is quite sufficient to cope with such cases. (I of course assume that vivisection is absolutely necessary for the progress of physiology.) And, much as I hate public agitation, I should throw myself into agitating against such measures, sacrificing my little portion of present science for the sake of science to come. My advice to you is, accept no compromise whatever, refuse to admit for a moment the need of such a law, and fight against it everywhere, in the newspapers and on the platform, and if the situation demands it, even imitate your opponents and refuse a political vote to a candidate who will not pledge himself to vote against it. I do not think I can say anything stronger than this last. To repeal a law is a very different thing from opposing the making of one."

demonstrated in England, where some medical and scientific men unwisely thought that by yielding to relatively moderative demands for legislation, further agitation of the subject would end. On the contrary, bills for the total abolition of experiments upon animals have been introduced into the British parliament since the passage of a bill similar to Senate Bill 1063.

5. Although it is contended by advocates of the bill that it will not interfere with the proper uses of animal experimentation, it is to be noted that the remarks of these advocates at the hearing before the Committee and the favorable report of Senator Gallinger are occupied largely with the presentation of the stock arguments of antivivisectionists against the value and the justification of experimentation upon animals. The most important of these arguments are the following: *a*. That medical and scientific men are divided in opinion upon this subject; *b*, that experiments upon animals have yielded results of little or no value to medicine or science; *c*, that such experiments are conducted with wanton cruelty and are brutalizing to those who witness or practice them. These arguments have been refuted many times. It would require a voluminous treatise to present the evidence relating to them adequately. It must suffice to mention only a few points.

a. It is untrue that there is any material division of opinion among well informed medical or scientific men as to the necessity and value of animal experiments. The names of a very few more or less prominent physicians, in no instance themselves scientific experimenters, are constantly cited, in some cases incorrectly or incompletely, by antivivisectionists in support of their position. Lists of other physicians collected by antivivisectionists as opponents of animal experimentation will not in general bear scrutiny as to the professional standing or scientific attainments of the majority of those whose names are given. The incorrectness of the statement of antivivisectionists here challenged must be apparent from the fact that whereas not a single medical or scientific society is known to have favored this bill, over a hundred such societies, which assuredly represent the great body of physicians and scientists of this country have protested against its passage. These societies represent the rank and file of the medical profession and not exclusively "ultra-scientists," as has been claimed. It is therefore unhesitatingly asserted that the medical profession and scientists, so far as their opinion receives authoritative utterance, are overwhelmingly opposed to this bill.

b. The constantly reiterated statement of antivivisectionists that animal experimentation has been of little or no value to medicine can be the result only of ignorance or of wilful misrepresentation. It would be surprising, indeed, if the experimental method, which is essential to every other science and has been the great instrument of modern scientific progress, should have no value for medical science. Surely this is a matter concerning which the judgment of the great body of enlightened physicians should be decisive. The progress of medicine from the time of the discovery of the circulation of the blood, which was based upon the results of animal experimentation, up to the present time, has rested in very large measure upon discoveries which could have been made only by experiments upon animals. It must suffice here to cite only a few illustrations of the practical value of animal experimentation, such as the establishment of the germ doctrine of disease, the introduction of antiseptic surgery, the prevention of childbed fever, the antitoxin treatment of diphtheria and other diseases, the prevention of rabies by Pasteur's method of inoculation, the successful treatment of myxedema and cretinism by thyroid extracts. Countless thousands of human lives have been saved and will continue to be saved by methods of prevention and treatment of disease, which are derived from the results of animal experimentation. Recent years have been particularly fruitful in discoveries of the highest importance resulting from animal experimentation. Never was there so little justification to hamper in any way the work of those engaged in searching by experiment for means of preventing and curing disease.

c. The claim of antivivisectionists that scientific experimentation on animals brutalizes those who witness and practice it, is an insult, without shadow of foundation, to a class of scientific workers unselfishly devoted to the investigation of problems of the highest importance to the welfare of mankind.

There is no part of the campaign of the antivivisectionists conducted with such gross misrepresentation of the facts as that intended to make the public believe that scientific experiments upon animals are conducted cruelly, that is, with the infliction of needless pain. A large part of antivivisection literature consists of leaflets and broadsides distributed wholesale among the public, containing pictures of animals and descriptions of experiments, which are in general so erroneous or garbled or unintelligible to most of those who read them, that they convey utterly false impressions. It is repugnant to the spirit of medicine and of science to resort to similar methods in order to counteract the deplorable effects of these emotional and misleading appeals of antivivisectionists to the general public. The charge of any considerable abuse of the practice of animal experimentation on the ground of cruelty, especially in this country, has been abundantly refuted by articles in journals and other publications, which unfortunately rarely come to the notice of the great majority of those who receive the gruesome circulars of antivivisectionists. Whenever the conditions of the experiment permit, and this is in the great majority of painful vivisectional experiments, all trained experimenters place the animal during the operation completely under the influence of anesthetics. There is no evidence that there exists today in any properly conducted laboratory in this country any abuse of vivisection on this score.

6. The advocates of this bill have not been able to point to a single authenticated instance of the abuse of animal experimentation in the District of Columbia. The same inability to specify instances of abuse in Massachusetts was demonstrated in the recent hearing before a committee of the legislature of that State relating to a bill to control animal experimentation. Notwithstanding most violent efforts on the part of English antivivisectionists to excite popular feeling by charges of wanton cruelty against scientific experimenters upon animals, the Royal Commission appointed to inquire into the matter "entirely acquitted English physiologists of the charge of cruelty." The Committee recommending Senate Bill 1063 has attempted no similar inquiry for this country, but it can be confidently predicted that similar charges made in the most reckless and wanton manner against American physiologists would be found to be equally unfounded.

It is not true that secrecy is practiced in the conduct of such experiments. In scientific publications these experiments are described in detail. There is no effort made to prevent properly qualified medical and scientific men from witnessing these experiments. For manifest reasons it would be as improper and undesirable to throw open such experiments to the inspection of those without any training or competence to judge of their character and value, as it would be to give similar publicity to surgical operations. In the absence of any demonstration of abuse of the practice of animal experimentation in the District of Columbia, this bill is unnecessary.

7. It is well understood that the organized and strenuous efforts of antivivisectionists to secure congressional legislation upon this subject is not so much to check abuses in the District of Columbia, where in fact they do not exist, as to influence legislation in the various States of the Union. Although they have made repeated attempts to secure legislation, generally far less stringent than that contemplated in this bill, in different States, they have hitherto been unsuccessful. Wherever full and fair opportunity has been given to physicians and scientific men, they have had no difficulty in demonstrating to the satisfaction of committees of our State legislatures the objections to any such legislation. We would call particular attention to the convincing arguments urged successfully against a much milder bill recently introduced in the legislature of Massachusetts, a State in which the antivivisectionist agitation has been particularly active.

8. The experience with legislation, similar in character to this bill but surrounded with more effective safeguards against interference with scientific experimentation in England, has been most unfortunate in its influence upon the advancement of medical science in that country. Many scientific workers in England, including Lord Lister, one of the greatest benefactors of the human race through his introduction of antiseptic surgery, have preferred to leave their country and conduct their experiments in continental laboratories, rather than submit to the vexatious restrictions upon their work. Earnest appeals have been sent by eminent men of science in England to physicians in this country not to repeat their mistake of yielding to the demands of antivivisectionists in this matter.

9. The District of Columbia already has an unusually comprehensive and effective law for the prevention of cruelty to animals, and there is no need of further legislation in the direction contemplated in this bill. Only properly conducted scientific experiments under proper authority are now allowed. Those who conduct experiments upon animals are no less subject to the provisions of the existing law than other members of the community. If they can be convicted of cruelty in the practice of their experiments, the present law provides adequately for their punishment. The antivivisectionists complain that they are unable to secure convictions of experimenters upon animals under the present law. If so, it is because they can furnish no evidence of cruelty in the conduct of the experiments convincing to a court of justice. Their demand that the doors of laboratories shall be thrown wide open to agents of their societies in order to procure evidence, would lead to a system of outrageous espionage utterly foreign to our system of government, and degrading and intolerable to the scientific men in charge of the laboratories.

10. This bill is unanimously opposed by the great scientific and medical bodies of this country, National, State and local, who recognize in its provisions a blow to freedom of investigation and to the advancement of medicine and biology. Among the five score and more societies which have protested against this bill may be mentioned The National Academy of Sciences, The American Association for the Advancement of Science, The Society for the Promotion of Agricultural Science, The AMERICAN MEDICAL ASSOCIATION, The Congress of American Physicians and Surgeons, The American Public Health Association, The United States Veterinary Medical Association, The Association of American Physicians, The American Surgical Association, The Association of American Medical Colleges, The New York State Medical Society and Association, and other State Societies, the New York Academy of Medicine, etc. The assumption that the protests of these societies have been made in ignorance of the provisions of the bill is absurd. It would be incomprehensible if Congress should ignore or disregard the united voice of these great organizations in a matter which directly concerns the welfare of medicine and biological science.

11. Although there is abundant evidence in the Report recommending this bill that the real sentiments of its advocates are hostile to scientific experiments upon animals, it is nevertheless asserted by them that the bill, if it should become law, would not in fact interfere with the proper uses of animal experimentation for scientific investigation and study. Such an assertion can be made only by those unfamiliar with the needs of medical and biological science and with the purposes of experimentation upon animals, or else ignorant of the provisions of the bill. To take up in detail all the provisions of the bill and to point out fully the manifold ways in which they would interfere with proper and legitimate uses of animal experimentation, would require more time and space than can here be given. This work has been done in part, but only in relatively small part by others, notably by the Secretary of Agriculture, the Hon. James Wilson, and by the former Acting Secretary of Agriculture, Dr. Charles W. Dabney, Jr., in their published letters addressed respectively to the Hon. Redfield Proctor and the Hon. James McMillan. It must suffice here to indicate only a few of the ways in which this bill would prove injurious to medicine and biology, but enough will be shown to demonstrate its fatally defective character.

A. The bill provides (Sec. 2, *b*,) that "The experiment must be performed by a person holding such license from the Commissioners of the District of Columbia as in this Act mentioned, or, by a duly authorized officer of the Government of the United States, or of the District of Columbia." It further provides (Sec. 3) that the Commissioners of the District may require the place in which any experiment is made by a licensee to be registered in such manner as they may direct and that every place for the performance of experiments for purposes of instruction shall be approved by the said Commissioners and registered in such manner as they may direct. It also provides (Sec. 5) "That the Commissioners of the District may direct any person performing experiments under this Act from time to time to make reports to them of the methods employed and the results of such experiments, in such form and with such details as the said Commissioners may require," and again in Sec. 7 the bill provides that "The Commissioners of the District

may at any time disallow or suspend any certificate given under this section."

It is evident that the bill gives uncontrolled discretion to the Commissioners of the District of Columbia in the granting of all licenses permitting experiments upon animals. They may if they choose, grant all applications for license or they may refuse all such applications and thereby prohibit all animal experimentation in the District, except that conducted by officers of the Government of the United States or of the District of Columbia. Experiments by the latter officers, as well as by licensees, they may hamper so as to make the privilege of experimentation practically useless, by demands for reports upon the methods and results of experiments at any stage of the experimental investigation as often and with as much detail and in such form as they choose. An unfinished experimental research can be interrupted or brought to an end at any time by suspension of the license in the discretion of the Commissioners. No provision is made for any hearing by the applicant or the licensee. There is no appeal from the decision of the Commissioners. They are the sole arbiters in the matter. They are made the dictators of the medical profession by this bill in matters requiring expert knowledge and sympathy with the needs of medical science.

No one can foretell in what manner the District Commissioners would exercise the arbitrary powers conferred upon them by this bill. It is certain that if they exercised them so as to meet the approval of those from whom this bill emanates and the antivivisectionists in general, who are its advocates, they would antagonize the medical profession and scientists and would inflict serious injury upon human and veterinary medical science and upon biology. On the other hand, if they administered the law so as to meet, so far as the bill permits, the wishes of physicians and scientific men, they would as surely antagonize the great majority of the advocates of the bill, who would continue their agitation and endeavor to secure still more prohibitory legislation.

Among the many objections to this bill there is none more fatal in the principle involved or likely to be more so in the practical working of the proposed legislation than that this bill places in the hands of a body of men, who need not be and are not likely to be physicians or men of science, arbitrary powers, requiring skilled knowledge in their use, concerning matters of the highest importance to medicine and biological science and to the welfare of mankind and of animals.

B. The bill provides (Sec. 6) "That the President of the United States shall cause all places where experiments on living vertebrate animals are carried on, in the District of Columbia, to be, from time to time, visited and inspected without previous notice for the purpose of securing compliance with the provisions of this Act; and to that end shall appoint four inspectors, who shall serve without compensation, and who shall have authority to visit and inspect the places aforesaid, and who shall report to the President of the United States from time to time the results of their observations therein, which shall be made public by him."

It will be observed that this section makes no provision that the inspectors called upon to scrutinize and report upon the experimental work of physicians and scientific men shall possess any special qualifications for such remarkable and responsible functions. Can it be assumed that the President will appoint only those who possess the requisite qualifications and where will he find them? Our Universities and Medical Colleges and Hospitals and Government Laboratories search the country over to find men fitted to conduct the experimental investigations which this bill would regulate and control and they have difficulty in finding those with requisite training, scientific knowledge and special skill. And now this bill provides that over such men as these shall be placed inspectors to determine whether their experiments are performed in the proper manner and upon proper animals and for proper purposes and to make reports upon their experiments, which reports shall be made public.

The character of the inspection desired by the advocates of this bill is made sufficiently evident by the provision of the original bill (S. 1552) that the Commissioners of the District "shall appoint and authorize an agent of the Washington Humane Society to make such inspection." The attitude of this society toward animal experimentation is clear from the extract from one of its reports already cited (p. 285). It certainly may be reasonably assumed that this society and antivivisectionists in general will claim and will secure representation among the inspectors provided for in this bill. Nor is it unreasonable to suppose that they may even control the majority of the inspectors. In larger or smaller part, therefore, the inspection will doubtless be by men or possibly women, not only without special scientific knowledge but actually opposed to experimental medical or biological science. It would be entirely in the power of such inspectors to render the conditions for experimental work such that no one would care to undertake it.

It is a libel upon common sense to assert, as is insistently done by the advocates of this bill, that the objection of experimenters to any such system of inspection as that provided for in this act, is due to their fear of exposure of wanton cruelties practiced by them in the secrecy of the laboratories. As a matter of fact, no secrecy surrounds the practice of animal experimentation, and any properly qualified person has free access to the laboratories where such experiments are made.

C. The hardship which would be inflicted upon those engaged in experimental research by the provisions of the bill that at any stage of their investigations they may be called upon to furnish detailed reports of the methods and results of their work and that those, with probably no comprehension of the nature and purposes of the experiments, shall make reports thereupon, which shall be published, can be fully appreciated only by those who are acquainted with the conditions under which scientific inquiry is prosecuted. There are many important scientific investigations which would probably not be undertaken at all under any such vexatious conditions as these. These provisions, as well as others in the bill, can be utilized constantly to harass experimenters in case the law should be administered, as is not at all improbable, by those unfriendly to experimental inquiries in medicine and biology.

D. The bill prohibits important and necessary experiments and surrounds the performance of others with such restrictions as virtually to prohibit them. Exactly how far this prohibition extends can not be determined without an interpretation by the courts

certain doubtful provisions of the bill, nor can any one foresee what new kinds of experiment, not now provided for in the bill, the future progress of medicine and biology will require.

The bill provides (Sec. 2, *a*) that "The experiment must be performed with a view to the advancement by new discovery of physiological knowledge, or of knowledge which will be useful for saving or prolonging life or alleviating suffering." If this provision be interpreted according to the explicit language used, and it may be presumed that the courts would so interpret it, no experiment can be made (except demonstrations for lectures provided for elsewhere in the bill) which is not for the advancement of knowledge *by new discovery*, and this knowledge must be of one of two kinds, either physiological or such as will be useful for saving or prolonging life or alleviating suffering.

The term "physiological" is used both in a broad and a narrow sense, and it can not be confidently predicted how the courts might interpret it. To compel an experimenter to pause before each experiment which he is about to make and consider whether he can demonstrate to the satisfaction of a court that the experiment, if not for the advancement of physiological knowledge, is for the advancement *by new discovery* of knowledge, which can be utilized in saving or prolonging life, or alleviating suffering, would not be conducive to progress in the very kind of knowledge specified. The history of scientific discoveries in medicine, no less than in other fields, demonstrates that experiments undertaken without any thought of practical application, and yielding results which appear at the time to be devoid of all practical utility, have often laid the foundations of knowledge of the highest importance to mankind.

Two valuable lines of experimentation at once suggest themselves as forbidden by the words of this section, viz., experiments to confirm results obtained by others, and experiments to acquire manual skill in performing surgical operations. The first of these restrictions was pointed out by Dr. Chas. W. Dabney, Jr., former Acting Secretary of Agriculture. Although the report upon the bill states that "the bill does not bear this limited construction," it is difficult to see how the plain language can be construed otherwise, and, if it was not the intention to prohibit confirmatory experiments, the question arises why those who drafted Senate Bill 1063, in copying this section from the British law, omitted the paragraph in the latter which expressly provides for experiments made "for the purpose of testing a particular former discovery alleged to have been made." Certainly the framers of the British law could not have considered that experiments confirmatory of alleged discoveries were already provided for by the section in question or they would not have added the paragraph omitted from the Senate bill. There is no other natural inference than that it was deliberately intended to forbid confirmatory experiments.

Experiments upon animals in order to acquire manual skill in performing surgical operations, certainly are not experiments for the advancement of knowledge *by new discovery*. Whether it was intended to prohibit such experiments is not clear. In Sec. 2, *c*, it reads "nor in tests of surgical procedure need animals be kept completely anesthetized during the process of recovery." There is nothing, however, here or elsewhere in the bill to indicate that these tests are to form any exception to the general requirement that, save demonstrative experiments for lectures, all permissible experiments must be for the advancement of knowledge *by new discovery*. If, as seems to be the natural interpretation of the language of the bill, surgeons are not to be permitted to perfect themselves in methods of operating by experiments upon animals, this prohibition can be characterized as nothing less than inhuman. The only alternative is to make a human being instead of one of the lower animals the subject of experiment. There are many operations which a surgeon may wish first to try upon an animal before attempting them upon a human being. An eminent surgeon has said that a surgeon should not perform the operation for circular suture of the intestine and for intestinal anastomosis upon man without first practicing it on animals.

The bill provides (Sec. 2, *c*,) that "The animal must, during the whole of the experiment, be completely under the influence of ether or chloroform," excepting in inoculation experiments, tests of drugs or medicines, and during recovery from surgical operations. It is absurd to limit the choice of anesthetics to two. There are other anesthetics which produce equal insensibility to pain, and any one at all acquainted with physiological experiments, knows that there are experiments in which it is safer, better, and sometimes for the purposes of the experiment necessary, to produce anesthesia in other ways than in the only two permitted by this bill.

The absurdity of the claim that this bill is simply restrictive and regulative, and not prohibitive of experiments upon animals, can be shown in many of its provisions, and especially by that which forbids the survival of the animal after an operation unless kept continuously under the influence of ether or chloroform. The only exceptions to this provision are inoculation experiments, tests of drugs or medicines and tests of surgical procedure. The experiments which are prohibited by this provision are so many that they can not even be enumerated within the compass of this statement. All physiological and pathological experiments where the ends of the experiment can be attained only by observation of the animal for days or weeks after some operation, or after the administration (save by inoculation) of anything except drugs or medicines which may give pain, are prohibited by this bill, for it is impracticable to keep animals during such periods of time continuously anesthetized. Such important experiments as those which have shed light upon the functions of the stomach by gastric fistula, or of the heart by the experimental production of valvular lesions, or of the central nervous system, kidneys, and indeed most of the organs of the body by observations extending over some length of time after an experiment, are all prohibited by the conditions of experimentation imposed by this bill. All experiments are prohibited in which anything, except drugs or medicines, is simply fed or introduced into the stomach in case the experiment is calculated to give pain to the animal and extends beyond the limited period in which it is practicable to keep the animal under ether or chloroform.

It may well be questioned whether it was intended to forbid the large class of important and necessary experiments of the characters described. If it was not, then the bill is so loosely drawn that it should never pass in its present form. If it was intended to exclude all of these experiments, then the blow which

its enactment would inflict upon biological and medical science is simply brutal.

There are other kinds of valuable experiments which are prohibited by this bill besides those specified, but enough has been said to show the error of the assertion made in the Report recommending it that "the bill is restrictive, not prohibitive," and to demonstrate that among the prohibited experiments are many of the highest scientific and practical value, including many which involve far less suffering to the animal than some which are permitted.

E. The bill provides (Sec. 4) "That a license shall not be granted to any person under the age of twenty-five years, unless he be a graduate from a medical college, duly authorized to practice medicine in the District of Columbia." There are graduates of Zoology and other departments of Biology under 25 years of age eminently qualified by their training for investigations involving experimentation upon animals. Concerning the effect of this provision upon the work of the Bureau of Animal Industry Dr. Dabney, in the letter already cited, says: "It would at once stop some of the experiments now in progress, and if it had been enforced in the past years would have prevented a large proportion of our scientific employes from doing this class of work."

F. The greater part of the investigations requiring animal experimentation in the District of Columbia are conducted in the Bureau of Animal Industry under the Department of Agriculture. This bill takes the scientific work of a Department of the General Government to a considerable extent out of the hands of the Secretary of Agriculture, and places it to a corresponding extent under the control of officials of the District of Columbia, and that too for matters which concern the agricultural interests of the entire country and only in relatively small measure concern the District of Columbia. The bill accomplishes this by providing that the Commissioners of the District may direct any person performing experiments to report to them from time to time the methods and results of their experiments in such form and with such detail as the Commissioner may require. It will be observed that it is not the Secretary of Agriculture who is to be called upon to report, but it is his subordinates. The bill further provides that if any of five kinds of animal (cat, dog, ass, mule, horse), are used for the experiment, a special certificate setting forth certain facts must be procured. The bill is singularly indefinite as to these certificates, especially not stating by whom they are to be given, or to whom application for them is to be made. If, as is not improbable, it was the intention that these certificates should be granted by the Commissioners, then the scientific work of the Bureau of Animal Industry is placed practically under the direction of these District officials, for no provision of the bill exempts officers of the Government from the necessity of procuring these certificates, as is the case with licenses.

No attempt has been made in this statement to present a complete analysis of Senate Bill 1063 and to point out all of its objectionable provisions or even to exhaust the objections to such as have been considered. No such complete analysis is necessary in order to prove the error of statements in the report recommending it that it is "reasonable and wise," "restrictive and not prohibitive," and permissive of all "useful investigations." It may be that the committee recommending the bill believed it to possess the moderate and reasonable character claimed for it. The defects of the bill are evident enough to those who are familiar with the requirements of modern medicine, in its scientific and practical aspects, and with the needs of biological science. So evident indeed are they that it has generally seemed unnecessary to medical and scientific societies and individuals, who have protested in hundreds against the passage of the bill, to do more than emphasize on the one hand the great benefits derived from animal experimentation and on the other the restrictive and prohibitive features of the bill. Apparently so convinced have many of the advocates of the bill been of its moderation, that they have assumed that these protests have been made in ignorance of the provisions of the bill, a most unwarranted and gratuitous assumption. It is not to be expected that any considerable number of the committee to which the bill was referred should possess that technical, expert knowledge essential for an intelligent judgment as to the effects of a complicated bill which prescribes by whom, and for what purposes, and upon what animals, and in what manner, scientific experiments shall be performed.

It surely could not have been the intention of the Senate Committee recommending this bill to inflict such serious injury upon medicine and science as, in the opinion of those who by their training, occupation and special knowledge of the subject are most competent to judge of its workings, it certainly would inflict.

THE ANTITOXIN TREATMENT OF TUBERCULOSIS.

OR THE DIRECT (TUBERCULIN PREPARATIONS) VERSUS THE INDIRECT (ANIMAL SERUM) METHOD OF IMMUNIZATION AGAINST TUBERCULOSIS.

Read before the Denver Medical Association and Arapahoe County Medical Society, Dec. 14, 1897.

BY CHARLES DENISON, A.M., M.D.
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Since Koch's discovery of tuberculin some seven years ago, we no longer wonder that the majority of medical men were turned away from the employment of this remedy by its ill-advised use, and the resulting gross effects, as shown by Virchow, the great pathologist.

From the absurd advertisement of a Swiss barber "tuberculin injections given here," and the equally preposterous belief which at first prevailed that a means to destroy tuberculosis had been discovered, as easy of use as a household remedy, we have come to learn that if cure it will, it must be by a concentration of skilled effort, and a technique involving as much discrimination in diagnosis and care as does the differentiation of a complicated eye refraction, the microscopic determination of blood changes due to disease, the endoscopic study of internal organs, or any other delicate field of professional work.

The great mistake of the celebrated discoverer of tuberculin (which in a measure is applicable, also to his later discovery tuberculin T. R.) was that there was no due recognition of the failures of physicians in the diagnosis of tuberculosis. In other words medical men failed to recognize the great variation of the disease to be treated by so powerful a remedy. We can now see how unfortunate it was for Koch to

allow his tuberculin to be indiscriminately used since no determination was reached as to what cases should be excluded, but rather a trap was set to catch the very class of cases which should never have had the remedy in its original crude form. I refer to the precaution announced in the first instructions that preference should be given to hospital cases where patients were to be kept in bed during the "reactions," in apparent neglect if not ignorance of the necessity of elimination, and the ever present need of recognizing other associated causative agencies, chief of which is that of climate. The concealed and therefore more serious tubercular lesions would be brought to light by the searching specific, and cheesy or tubercular pneumonias which would necessarily have to undergo the expected process of "necrosis" would in some way (?) have to be taken care of. Indeed the indiscriminate use of tuberculin was an absurd and indefensible proposition under the conditions specified. I abandoned Koch's proposed method within a month of its commencement, and thereafter refused to give the treatment unless patients were well enough to come to my office and could take exercise enough to eliminate the tubercular bacilli or their toxins when thrown off or set loose by the special agency used.[1]

So tuberculin is said to be a failure and the perennial essayist, in assumed wisdom, which seems almost ludicrous to one who knows the truth, exclaims, "Hic jacit" tuberculin the chief of specifics for consumption! As to the original product, should any professional brother desire to investigate the proofs, I can select for him a dozen or more persons, who were once actively tubercular, and who from seven to four years ago were treated hypodermatically with relatively large quantities of the crude tuberculin and who are now apparently well and free from any sign of tuberculosis.

As a result of these years of investigation of tuberculosis by such eminent men as Klebs, Trudeau, Von Ruck and Whittaker, there is no doubt in my mind that the healing specific, the immunizing agency, lies somewhere in the bodies of the tubercle bacilli. Koch practically acknowledges this when he uses the whole of the germ to make his new tuberculin T. R., a product in reality the clear portion of an *emulsion* of the bodies of the bacilli.

While among veterinarians the crude tuberculin has been generally used and acknowledged as the best diagnostic means ever found for the detection of tuberculosis in cattle (a diagnosis that I have thus far utilized with satisfactory result in twenty-one human beings), yet the successful application of the remedy in the arrest of human tuberculosis has been made but by very few. Those who have had the courage, intuition and skill to succeed in this line are well represented by Dr. James T. Whittaker of Cincinnati, who answered the objections to the use of tuberculin in an excellent paper on "General Impressions from Six Years use of the Old Tuberculin," read before the British Medical Association at Montreal, Sept. 2, 1897. He concludes in these words, "aside from the objections urged by ignorant and prejudiced people, not worthy of notice, four apparently valid arguments accumulated, in the course of time, against the use of tuberculin in man.

"1. That the reaction occurred in the absence of tuberculosis. This objection has been met by the demonstration of concealed deposits.

"2. That the reaction occurs in other diseases, syphilis, lepra, actinomycosis, etc. This objection has been met by the demonstration of tuberculosis coincident with or complicating these maladies.

"3. That the reaction will occur in the most quiescent cases even where the bacilli are not only concealed but encapsulated and deposits are partly calcified. This is no objection at all, but a most striking confirmation.

"4. That the use of it is dangerous; that it not only awakens the disease from latent sources but disseminates it over the body and this leads to an infection and increases the danger of infection of others. This conclusion rests on a false premise and confounds the *post* with the *propter hoc*." I have quoted so much because this verdict, like everything Dr. Whittaker writes, is a clearer statement than I could make; but I can heartily endorse it, for during the same long period there has been no time during which I have not had from half a dozen to twenty tubercular patients undergoing this form of immunization by means of some form or derivative of tuberculin.

It has been my desire, if possible, to find such a derivative from or modification of tuberculin, uniform, standard, and freed from all undesirable qualities, as will be acknowledged by the medical world to be a true specific for tuberculosis. I mean just as much an antitoxin for this chronic and perplexingly variable infection, as, in its way, is the antitoxin for diphtheria for that acute and unique disease. You may assert that, with the necessity for a congenial soil for tubercular infection before the disease can find lodgement, and with all the varying complications of susceptibility, of natural resistance, of climate, of age and associated conditions—different in every one of a thousand cases—that the thing is impossible, I believe it *is* possible and that all these varying conditions are simply elements to be duly weighed and accounted for in our battle against this insidious disease.

There are a dozen, more or less, of tuberculin preparations, extracts or serums, which I have to mention.

1. The crude or original tuberculin of Koch, which is the glycerin extract of the dead bacilli, as I understand, filtered through porcelain.

2 Then comes Klebs' first modification, a purified article called tuberculocidin, in which the crude tuberculin is deprived of much of its toxins and reactionary power.

3. Following this is the name antiphthisin which Klebs gave to practically the same product manufactured in this country.

4. Tuberculinum purificatum, which name Dr. Karl von Ruck of Asheville, has given to his manufacture of practically the same preparation.[2]

5. A purified tuberculin made by Dr. Whitman of Los Angeles, Cal., from the culture fluid in which the bacilli have been grown, not yet standard in strength but which I have found to be moderately efficient.

6. Oxytuberculin,[3] the lately much talked about

[1] Exercise and Foods for Pulmonary Invalids," pp. 13 and 14.

[2] We understand this is made as follows:

"Take the entire ripe culture of tubercle bacilli and transfer to vacuum apparatus, and concentrate to 1-10 of the bulk at 55 degrees C. This takes about a month; remove from vacuum and filter through paper for removal of bacilli, and next through porcelain. Now precipitate with acid solution of sodic-iodid of bismuth and filter. Next neutralize the acid solution for reprecipitation of bismuth salts and filter. Next precipitate with absolute alcohol adding enough to bring the entire bulk to 90 per cent. alcohol; let stand and when precipitate has formed, filter. Collect, precipitate and wash it with more alcohol (absolute) dry, weigh and make 1 per cent. watery solution and filter. It (purified tuberculin) differs from antiphthisin in that it is made and concentrated with the tubercle bacilli in the fluid and it is filtered through porcelain as well as paper. It differs from tuberculocidin, in that it is prepared and concentrated at a low temperature (50 degrees C.) instead of at (100 degrees C.) boiling temperature, and filtered through porcelain.

remedy of Dr. Hirschfelder of California, in which a small per cent. (said to be 5) of tuberculin is, under great and protracted heat, saturated with peroxid of hydrogen. The effect of this, if any, besides that of the contained tuberculin, the discoverer claims, is the conversion of the toxin into an antitoxin. This increase of curative effect but slightly shown by my own limited use of the remedy, as I have had only a four-weeks trial of it in a single case. So far, however, the result is not unfavorable. If this creation of an antitoxin outside of an animal body is verified, it is indeed a wonderful discovery; then it is to be hoped that the bulky dose prescribed for injection will be reduced to 1 c.c. or thereabouts. It is not impossible that the excessive oxydation has simply destroyed the toxins, and so left a large amount of a healing property, not yet fully understood but common to so large a bulk of tuberculin.

7. Koch's new tuberculin T.R., descriptions of which you have lately seen in the medical press.

8. Dr. Karl von Ruck's watery extract of the bodies of the dead bacilli, which is a like powerful remedy in immunizing strength to the new tuberculin (T. R.) and I judge will compare favorably, with the same.

This extract is liable to give reactions in susceptible persons, for it is highly charged with immunizing power.[4] I have tried the procedure recommended by von Ruck and found it in the main quite satisfactory, namely to commence with the purified tuberculin and work up from 1-10 c.c. to 2 c.c. and then every second or third day give 1-10 c.c. of this stronger undiluted extract, possibly working up to 3-10 to 5-10 c.c. as a terminating dose, the intervals between treatments being lengthened toward the close of the course.

I will explain why I have not used Koch's new tuberculin (T. R.) While the fact previously cited, that the bodies of the bacilli contain the immunizing or healing principle, may be proven by the claimed improved effect of the new over the old tuberculin, yet the admitted fact remains that it is practically an emulsion which Dr. Fisch says is essential according to Koch's intentions and that its curative power would be lessened by filtering through porcelain. Drs. Trudeau and Baldwin (*Medical News*, Aug. 28, 1897) claim to have found the fragments and the whole bacilli in it by microscopic examination. While this would not deter me from using it in an understood case, where the infection was already so great that thousands of bacilli were known to be thrown off daily in the sputum, yet I do not like the technique of its administration nor the idea of my diagnosis being "hedged" against by such a range of dose, equivalent to 1 to 500,000, as Koch (from his experience with the average medical man) has deemed it best to establish. The finally accepted remedy should, I think, be not so liable to deteriorate; it should be stable, uniform, made entirely safe by careful filtration, and the range of dose need not exceed 1 to 1,000 or less.

I am aware that Trudeau has claimed that antiphthisin is only a very weak tuberculin, but in my considerable experience with it and the tuberculinum purificatum during the past four years, in comparison with the use of crude tuberculin during the previous three years, I have been satisfied that it was safer, that there was less resulting general reaction as well as local reaction in affected areas. The distinctive tuberculosis temperature is apparently more easily controlled by its use.[5]

The tuberculin products thus far considered, with the possible (?) exception of oxytuberculin, are supposed to work by their toxin creating or stimulating the production of an antitoxin in the blood of an affected person. We now mention an additional class where the antitoxin has already been produced in an animal's blood, preferably one already immune, and then through its serum made available in the treatment of tuberculosis. I believe it is possible to do this, as is the case with diphtheria. Whether it is preferable to making the affected system create the antitoxin, I will not attempt here to discuss. It is a difficult and important point to decide. I have seen some persons (previously under the tuberculin treatment) who seemed after some months to be losing their thereby acquired immunity, and whose systems seemed to respond to a renewal of the treatment, as though that particular stimulant to antitoxin activity was just the influence needed. Whether an artificially created antitoxin introduced from without the human body will have an equal or a better effect I have yet to learn.

However, from the many investigations thus far made with serums, we are enabled to assume that an efficient antitoxin to tuberculosis can be produced in the serum of an animal's blood, but it is yet undetermined how much of this effect is purely antitoxic and what proportion of it is transmitted tuberculin. The question of transmission would seem to be relative, the size of the animal treated, and the character and amount of the toxin administered, together with the time before and again after treatment with reference to the taking of serum, all being important considerations. This, too, is a difficult question to decide, for the toxin, if transmitted, may be wholly or only partially neutralized by the antitoxin created in the animal's blood. E. Müller (*Jahrbuch f. Kinderheilkunde*, Vol. xliv) claims, from a study of the blood of children treated with the anitoxin of diphtheria, that the time of the excretion of the antitoxin varies in different individuals, even of the same age and body weight, and that there is no direct connection between the size of the dose of the antitoxin and the duration of the power of immunity, *i. e.*, the time the antitoxin remains in the blood. He shows the protective power of the blood on successive days of a number of individuals, sufficient antitoxin to confer immunity seldom remaining after three weeks. Should we not bear in mind that this study was for diphtheria, comparatively active in its toxicity, and admit for a more chronic disease, as tuberculosis, a similar variability in its antitoxic and immunity laws commensurate with its chronicity?[6]

[3] Transactions California State Medical Society, 1897.

[4] In making this extract virulent cultures are used and the proteids (it is claimed 80 to 90 per cent. of them) are extracted with ether from the filtered bacilli. After repeated dryings on porcelain plates, the filtrates (bacilli) are repeatedly powdered and macerated over permanent water baths and the resulting proteids are passed through porcelain in a perfect watery solution which is then made to a standard strength watery extract, which when used, can be still further diluted if desired.

[5] For cases in illustration of these favorable effects reference is made to my previous paper on these subjects. "Tuberculin and the Living Cell." Transactions of the Am. Climatological Asso., 1892, and "Antiphthisin," Medical Record, July 20, 1895.

[6] Over four years ago, learning from experiments on healthy puppies that they would stand for their size, very large doses of Koch's tuberculin, I conceived the idea that the toxin in this extract might be thus neutralized and a beneficial change in the tuberculin treatment result. I went to the expense of having a healthy pup treated in the course of seventy-two hours, with about 1 c.c. tuberculin to the pound weight. Twenty four hours afterward the pup was killed and all his serum taken. This was nicely done for me by the New York Biologic and Vacinal Institute. Though no harm resulted from the use of this serum, it was not a brilliant success, for I got the rash, which serums so often cause, and what I thought was a lack of the

Of late the proper technique of serum production is being gradually determined and we have now several antitubercular serums which have gained for themselves a curative reputation.

In Italy Maragliano's serum, made at first from a goat's blood (as I understand it), is now obtained from the immunized horse. Maragliano's results with the goat's serum speak very well indeed for his product and the proportion of successes were about the same, but no better, so far as I could determine, than ours in this country with antiphthisin or purified tuberculin. Furthermore the absence of definite knowledge of the manufacture, strength and dosage of his serum, precluded my own trial of it. This is the "cure" which has lately been lauded to the skies by the sensational newspaper claims of a New York daily.

10. The antitubercle serum of Paul Paquin, though one of the first made in this country and tried by many physicians, I have no personal knowledge of except from results (mostly favorable) observed in a number of patients coming under my observation after they had been treated with it. These results were not distinguishable from those of crude tuberculin, and I can not say that there was not the transmitted effect previously referred to.

11. Professor Crandall, also of St. Louis, immunized a horse I believe with tuberculin (?) taking some two years for the process before the serum was used. I gave it a faithful trial. The results were not bad, nor were they as good as with the purified tuberculin. I could not determine that there was any "transmitted" effect of tuberculin, but I got the serum rash in two out of five cases treated.

12. The H. K. Mulford Company, of Philadelphia, have been faithfully perfecting a serum. To produce this they chose asses as the animals most immune to tuberculosis. When in Philadelphia last June, I examined these animals at their bacteriologic laboratory and was one of the first to try their perfected serum. Its effect was better than that of any serum previously tried; seemed to raise the patient into an exalted state, hopeful of recovery, with physical signs and ability to do, perceptibly improved. This was strongly shown in two young men of the five cases treated, who were hopelessly advanced in tuberculosis, both of whom had large excavations in the lungs. One of these afterward went home to die, and the other has improved by living among the foot-hills and having an injection of this ass's serum once or twice a week. The objection to this serum is its lack of sustained effect and the serum rash, which occurred in one or two cases.

13. We now come to consider the last and I think the best of the antitubercular serums, the antiphthisic serum (T. R.) made by the John T. Milliken Company of St. Louis, according to the formula of Dr. Carl Fisch. In his address, read before the Mississippi Valley Medical Association, at Louisville last October, Dr. Fisch presented the tabulated results of an elaborate animal experiment, or test of this new serum. The serum is peculiar in that the selected horses from which it is taken have been strongly immunized, charged with Koch's new tuberculin (T. R.), the process usually taking four months and the serum being drawn fourteen to twenty-eight days after the last injection. When it is considered that for a last dose 50 c.c. of tuberculin T. R. was given the horse, which I am informed has now been increased to 100 c.c., we can get some idea of the enormous load of tuberculin these animals are carrying in the blood by remembering that according to Koch, the initial dose of tuberculin T. R. should be 1–500 of a milligram.

Between one and two hundred guinea pigs were used in Dr. Fisch's interesting test.

1. The T. R. serum was shown not to increase but rather to lessen the temperature of a healthy guinea pig for the first three to nine hours.

2. Guinea pigs previously immunized with T. R. serum withstood without harm fatal doses of virulent tubercle bacilli virus, while the control animals died in twenty-one to twenty-four days.

3. The least quantity of T. R. serum needed, previous to the poisoning of the guinea pig, to sufficiently immunize him was determined: 2½ c.c. in five injections during the previous month being sufficient to keep alive and healthy a 600 gram weight guinea pig.

4. The T. R. serum and virus were injected mixed and the proportion of the former sufficient to neutralize a fatal dose of the latter was thus determined *i.e.*, from ¼ to 1 c.c. of the serum.

5. Separate injections of the serum proved that (even commencing the tenth day after guinea pigs had received the fatal injections of the poison) they lived while the controls died in from twenty to twenty-eight days, as well as three controls treated with Paquin's serum, after the fatal toxin had been administered to them four days.

6. The serum treatment was shown to have a lowering effect on the abnormal temperature of these poisoned guinea pigs, *i.e.*, from the second to the sixth day a total average decrease each of 2 degrees F.

7. The amount of T. R. serum which would inhibit the poisonous effect of tubercle bacilli and also which would inhibit the reaction to tuberculin was determined; all of which constitutes an experiment calculated to fill us with hope for the trial of this new serum on human beings. Dr. Fisch claims that if there are reactions to T. R. serum which he does not ordinarily find in the affected human being, that they are not the same as from the crude or old tuberculin. To me it does not seem to be so harmful if there are some slight reactions according to the dose given and the susceptibility of the patient, just as we would expect from this remedy; for even if the tuberculin T. R. has not all been neutralized or changed to an antitoxin in the animal's blood, we have a stable, soluble, preservable in standard strength remedy, chiefly in antitoxic form, one which can be relied upon for immunization against tuberculosis, and safe compared with Koch's new tuberculin. How permanent its effect will be has to be left for the lapse of sufficient time to determine. The half dozen cases I have to report on, are not claimed to establish a cure, especially as I have never allowed myself to abandon other and important means of relief simply because I happened to be giving any of these forms of tuberculin. We need all the help that the proper individualizing of a patient will suggest, and we will contentedly bear the charge, sure to be made, that the always admitted essential aids, the preferable climate with good feeding, systemized exercise (including proper inhaling), and hopeful conditions or environments have done it all.

distinctive healing sounds I had expected to find in the affected lung, and so went no further with it.

Case 1.—S. H. F., aged 48; machinist. From Indiana, one month in Colorado when first seen by me July 28 last. His lung disease is said to have commenced with a chill and fever May 1. He is not improving, I think because of tubercular pleurisy at base of right lung, the apex of which is excavated, and top of the other lung slightly affected. A case of laryngeal tuberculosis as well, with nasal complications, bilious temperament and torpid liver. Not a favorable case by any means, when one considers that the daily ounce of purulent expectoration contained fifty-five tubercle bacilli "to the field" on September 15, when the antiphthisic serum T. R. was first administered. The injections were given every alternate day below the shoulder blade commencing with ½ c. c. and gradually increased until a decided reaction limit was found at 1½ c.c. Reaction temperatures inclined to be prolonged if 1½ to 3 degrees F., were found after 1½ up to 1 7-10 c.c. doses, and I learned that I had a more powerful serum to contend with than I had ever used before. A return to 1 c.c. for the dose gave better results with no temperature rise above 99 for quite a while. Meanwhile up to October 30, he had received 25 c.c. in twenty-one injections, the sputum had greatly diminished in quantity and showed "ten to field" in about two weeks and "one to field" in six weeks. The pleurisy had subsided, partly at least, controlled by wearing a restraining bandage devised to specially limit the movement of the affected area. The effect was good and all the physical signs improved. Unfortunately this patient had to go back to his Indiana home, October 30, but he is still having the remedy administered there and reports improvement continued, with a gain in weight of twelve pounds since the commencement of the treatment.

Case 2.—F. J. M., aged 24; draftsman. Came to Colorado in May, 1897, from Massachusetts. Lung trouble probably dated back to pneumonia five years ago, and a severe cold one year ago. Decrease in weight of twenty-four pounds from his average to 108 pounds, both apices show an advanced fibro-tuberculosis, the third stage being more marked on the right than on the left side. By this evidence the diagnosis of a non-active fibro-tuberculosis both sides was made. Serum T. R. has been given for its general effect with the result that we now have a diminution of expectoration and some improvement. The proportion of the very few bacilli in sputum not yet much changed, improvement in physical signs but no gain in weight, though bad environments and confined occupation, leading to frequent colds, are disturbing elements which have to be accounted for in this case.

Case 3.—Sept. 20, 1897. Mrs. H. Age 27. Came from Connecticut. Weight at this date ninety-nine pounds. Had a hacking cough for eleven years, and two years ago sympathetic whooping cough and fever at times. Now some restrained action at base of right lung where once she had pleurisy, but the chief trouble is a chronic catarrhal fibro-tuberculosis, second stage, upper half of left lung, with softening spot threatening under left shoulder blade. Commenced the T. R. serum September 22, and on alternate days gradually reached 1 c.c. for a dose which has not been exceeded. Bacilli to the field, seventeen large with streptococci and staphylococci. November 2 and 18, seven and eight to the field, small and beaded and less "mixed" infection. November 28, the record contains this note—Has taken 27 c.c. antiphthisic serum and has now no reactions and physical signs have all improved. The temperature being below 99 degrees P.M. and weight now is 106 pounds.

Case 4.—J. A. R. Chemist, age 28, came from New Orleans, July 6, 1897. First seen by me September 18. A case of tubercular broncho-fibrosis of six years standing with hemorrhagic tendency, first stage; both upper halves of the lungs, chiefly right. Up to date taken the T. R. serum treatment ten weeks every other day since September 19. The spirometrical record has improved from 170 cubic inches to 200. He has improved in weight and in general as well as local signs. The record of his sputum examinations is as follows: September 18, 25.3 to the field; September 30, 20.3 to the field; October 18, 2.5 to the field. November 2 and 19, one to five and one to ten fields. December 3, 4 to field (been confining himself too closely indoors.)

Case 5.—J. E. L. Age 24. Newspaper reporter. Came from Pennsylvania. July 4. A case of laryngeal tuberculosis with broncho-fibrosis originating some two years ago but aggravated by overwork at night, one year ago. First stage, left side chiefly affected, but evidences of bronchial involvement top of both lungs. Has taken the serum treatment over six weeks (18 c.c.) with exercise, inhaling, etc.; doing well. Had left side pleurisy at one time which has disappeared. Expectoration much lessened in quantity, chest sounds improved, weight increased six pounds. No elevation of temperature now, though there was a little during the first part of the treatment; voice which was quite hoarse has improved and strengthened. Bacilli to field October 13, seven, November 20, one to three fields. December 14 none.

Case 6.—W. S. Book-keeper. Age 31. Arrived from Wisconsin, October 28. A case of tubercular broncho-fibrosis with suspicious laryngeal complication, both lungs affected in first stage, also has fistula in ano. Acclimatization may have something to do with his improvement for it has certainly been remarkable. Before giving the serum injection his temperature each day was from 98.5 degrees to 100.5 degrees and by the time 1 c.c. dose was reached the next day's rise was slightly increased. Since then 99.2 degrees has not been exceeded. December 3, after 12 c.c. had been given, the record showed, weight increased 156 pounds, a gain of six pounds in one month. Fistula nearly stopped discharging, sputum lessened in quantity about five times, and the bacilli in it reduced from 23.2 to 2.8 to the field. The physical signs and general strength are also on the gain. In fact the outlook for this, as well as for the others of this group, is bright for a permanent arrest of the disease. There have been five or six others who have taken the same treatment for shorter periods, but not long enough for any definite results. One of them, however, shows great succeptibility and the diagnostic effect of the T.R. serum which is worthy of notice.

A gentleman aged 26, referred to me by his physician in Pennsylvania, was seen on October 22, having arrived in Denver two days previously. His trouble seemed to have originated ten months previously, and he had visited North Carolina without benefit. A laryngeal and pharyngeal tuberculosis with lung involvement very slight at both apices, with principal centering point in left inter-scapular region, seemed to me at my first examination to be all that there was to explain the case. But the effect of the T. R. serum injections made manifest the incompleteness of my search as well as that of several physicians who had examined him previously, namely, that I could not reach the 1 c.c. dose the general and fever reactions were so great and prolonged. At two times, after 7-10 and 6-10 c.c. injections, he informed me he had stayed in bed all day, he felt so ill and feverish, the grippy signs being similar to occasional reactions I have seen from the the old tuberculin. I felt confident there was a concealed cause somewhere. This the stethoscope finally revealed in the left infra-mammary region, where, over an area, not larger than a silver dollar, pleuritic friction with fine crackles were heard only at the end of forced inspiration, and without any pain. Under proper restraint, to promote adhesion and limit movement, I think this condition is gradually improving and that this case will also be a favorable one.

In closing I will add that this diagnostic power, a valuable evidence of the real efficiency of the new remedy, together with the infrequency of the resulting serum rash (though local reaction, infiltration, etc., at the point of needle puncture will sometimes be seen), is or ought to be a recommendation for this T. R. made serum; especially to those physicians who understand its import. That this preparation can be made standard and safe will also do much toward overcoming the natural prejudice which pertains to the use of either Koch's old or new tuberculin.

HOW WE TREAT CONSUMPTIVES TODAY.

Read before the Tri-State Medical Association of Alabama, Georgia and Tennessee, at Nashville, Tenn., Oct. 13, 1897.

BY PAUL PAQUIN, M.D.

ST. LOUIS, MO.

From the very beginning of the application of antitoxins in diphtheria, tetanus and other infections, it was hoped that it would also be beneficial in tuberculosis, and to that end many investigators have

labored faithfully in all parts of the world. Maragliano, in Italy, first sought a remedy in the natural blood serum of the ass, and in the latter part of 1885 or in 1886, he reported the results of his work with the serum of the same animal, previously treated to increase immunization. Prior to this, however, Richet, Héricourt and others in Europe had used the natural dog blood serum in various forms of the disease. I began to immunize horses against this affection in 1894, and in January, 1895, reported the first clinical results with the first immunized horse blood serum ever obtained or used, so far as I am able to learn. Many criticisms, kind and unkind, and unwarranted reflections scarcely dignified, followed, and some have stooped to public persecution, but the work has progressed. Today, amidst the puerile denunciations of sciolists, I have the consolation of finding my humble researches respectfully considered by some of the leading scientific lights of Europe and America and the results obtained with it, attested by conscientious clinicians of high reputation in many quarters of this and other countries.

In spite of the beneficial effects of climate and other forms of treatment in vogue, and the vaunted claims of recoveries said to have been produced by a hundred different processes, there seems to be no doubt that sero-therapy, being nature's own remedy in infections, is the most promising. None of the other therapeutic measures used seem to offer so much hope or confidence. A seventh of the population die from the effects of consumption in one form or another, and probably four-fifths of this percentage succumb to the disease affecting the respiratory organs. Such an excessive mortality due to one disease warranted the beginning and continuation of my experiments, and investigations by the whole profession, in any legitimate line, for the discovery of a treatment that shall subdue suffering, reduce the mortality and arrest the progress of inherited conditions of tuberculosis.

Tuberculosis may affect all the organs of the body, but its seat of preference is in the chest. The respiratory organs of this cavity offer, apparently, the best field for the germs to grow, and more beings succumb to pulmonary phthisis than to all the other forms of tuberculosis together. It is this form I shall consider chiefly in this paper. It is the kind we see every day.

First, what is the nature of pulmonary phthisis? It is, unfortunately, nearly always a complicated affection, even in the very early stages. Very early in the development of the disease, we find associated with the bacilli of tuberculosis a number of other germs, among which some are as deadly and as destructive as the specific microbe. Comparatively speaking, tuberculosis is essentially a slow malady, even in acute cases. Its primary lesions consist of one or several local points of inflammation, due to the growth and multiplication of the bacilli, which occurs at the expense of the cells, their secretions and products, among which the germs are lodged. During this development, toxins are generated. They are poisonous, as the name indicates, and they cause the death of the cells around them and these, eventually, soften and become liquefied. It is thus that we obtain the first formation of caseous matter of pure tuberculosis which, in such conditions, is not mixed with the products or pus of the ordinary septic or pyogenic germs. During this first evolution of a case of tuberculosis, at its initial point of infection, a protective envelope is formed by nature's recuperative forces, and it is soon such as to surround the lesion, thus circumscribing it and limiting the pathologic development. Then we have formed a tubercle, which may vary in size from that of a point of a pin to a walnut or larger, the most voluminous nodules being usually the result of the junction of several small tubercles or their coalescence. If a section is made through tubercles at various stages of their development, it will be found that from a hard consistency at the beginning they gradually soften and, so far as germs are concerned, they first contain only the bacilli of tuberculosis. But, when softening of these tubercles takes place to the degree that their envelope ruptures, there is offered to the germs which are inhaled, a means of ingress into diseased tissues which are fit soil for the latter's development. This is the beginning of mixed infection. From that time on, the expectoration of a patient not only demonstrates the existence of consumption germs, but large numbers of other pathogenic microbes, such as the streptococcus, staphylococcus, the tetragenus and numerous other complicating organisms more or less effective in their power to destroy tissues. Such complications seem to be of tremendous power in the causation of softening of large areas of lung tissue and in the production of cavities. Then, we have to deal not only with the associated microbes and the lesions they produce, but also with the toxins which they generate and which, separately or collectively or, perhaps, in chemic combination, produce various forms of toxemia and alter the blood, the nervous system and, as a consequence, affects the whole organization banefully in a more or less pronounced manner.

Tuberculosis in the early stages, before serious microbic complications arise, produces as a rule a comparatively mild fever, the temperature seldom rising above 101 degrees F. When the complications appear, the temperature rises to 102 degrees F., 103 degrees F. and higher, according to the degree of infection, the extent of the lesions produced and the quantity and quality of the toxins. It is not necessary for the purposes of this paper, to go deeply into the pathology of tubercular developments. I merely desire to impress you with the importance of recognizing the nature of the lesions and other pathologic conditions, in a general and special way, before applying any remedy, and also the necessity of considering the peculiarities of each individual case, in order that the disease be not treated only on a general plan supposed to be applicable to all; but rather that each individual case be treated on its merits. It is not enough to treat consumptives as such. One should treat the patient against the general and special diseased conditions existing. The local lesions and the special effects thereof; the direct results of tubercular development upon remote organs or systems; the general depression dependent on such conditions; the individual characteristics and mode of life; the inherited predispositions; all these should be considered before instituting treatment. The disease yields or resists very differently, according to the nature of the infection, its effects and the peculiarities of the patient's individuality. It is needless to say, for instance, that patients who have inherited the elements that predispose to tuberculosis do not offer the same physical resistance to the destructive power of the germ of this disease as do those unfortunates who

have contracted the malady by accident and have more vital energy. In concluding this preface to the discussion of the treatment of tuberculosis, I wish to say a word with reference to the method of producing the antitoxins which are most suitable for the treatment of consumption.

As stated above, my first publication on the subject of serum in tuberculosis was made early in 1895. At that time, I was not ready to publish in detail the *modus operandi* of the laboratory processes. Since then I have repeatedly, at various medical meetings and through the medical press, explained more or less fully the various methods of immunization which I have tested from time to time. In 1894, I realized that the simple use of toxins in the treatment of the horses used for the production of antitoxin was not sufficient to produce complete immunity because it had been demonstrated that not only the liquid toxin (viz., tuberculin) of the germ of consumption was poisonous, but also that the structure of the parasite contained poisonous elements of a deadly character. Thus it was, that very early in my work, I used not only tuberculin for injections of the animals used to produce antitoxic serum, but used besides the structure of dead germs or germs with vitality purposely lowered and then mixed with sterile water. I have used the live germs also, following injection of these solutions. Thus it will be seen, that at the beginning, I used chiefly tuberculin to immunize the horse, gradually adopting methods which insured, more and more, the effects of reaction upon both the liquid poisons and the germ substance. Some tuberculins I used at the outset were produced by recognized authorities; chiefly such as Koch and the Bureau of Animal Industry in Washington. By the mixture of these liquid toxins and the germs, seriously modified or not, all the elements of the tubercle bacillus entered into the immunizing agent. But a question of importance, with respect to the reaction of the animal to these injections arose during that work, and it was this: What proportion of the toxic element of the germs was absorbed by the economy of the horse? It was evident that the greatest quantity of the most virulent quality of all the tubercle toxins, be absorbed in order to produce the greatest reaction and the highest immunity. Koch of Berlin gave help to the production of more perfect immunizing material when he brought forth his new tuberculin, which he specifies under the name of T.R. This, according to the publications which have appeared, is nothing more than the poison in the structure of the germs of tuberculosis extracted by rubbing these germs in a mortar, and by centrifugalization means. For use, this preparation is mixed with sterile water or glycerin, or both, and may be preserved by the addition of a minute proportion of formaldehyde or .3 to .4 per cent. of trikresol (as is the case for the preservation of the serum itself). The object of this pulverization of the germ structure is to liberate the toxin as much as possible and facilitate the absorption and assimilation of every toxic principle they contain. We produced practically the same thing at the laboratories under my control, for at least two years, for the purpose of immunizing horses.

By injecting a mixture of tuberculin and pulverized germ substance into a horse, in doses varying from one cubic centimeter daily or periodically to thirty or more, during from two to four or six months, we get a blood with serum that has resisting powers more or less pronounced, against the development of tuberculosis.

Now, as to the treatment of the disease. Bearing in mind the essential factors that contribute to the pathology of tuberculosis and the various circumstances that may influence it, how should we treat the disease today? Is sero-therapy promising enough to warrant its use and warrant further experiments and investigations? Yes. If it arrests one case in a certain stage does it, therefore, promise to arrest another in a similar stage, irrespective of other influences favoring destruction? No. There is no one treatment applicable to all forms of tuberculosis, irrespective of the conditions complicating or influencing the malady, or irrespective of the actual pathologic conditions locally. Anti-tubercle serum can be justly expected to act only against the purely tuberculous processes, and this, by no other means than the usual physiologic interference which nature herself sets forth to neutralize the toxic products of infections and subdue the microbic invasions. Sero-therapy in the treatment of consumption has its reason of existence because it is based on natural law. Yet it should be sustained by such forms of special and general treatments as the conditions present may demand. This assistance is useful to facilitate and hasten the repair of the damage done to the organization. True, we have on record apparently complete recoveries from serious conditions, which have occurred after the exclusive use of anti-tubercle serum or serums for mixed infection; but we have a greater number of such recoveries and more numerous improvements as the result of scientific management of the patients and a properly combined treatment including serum as special medication. A patient may recover by the effect of serum alone, when the result of the disease is not such as to affect organs or systems of paramount importance, such as the lungs, the throat, the circulation, the nerves, the stomach, etc., so severely, as to preclude the possibility of their restoration by nature's own force, after the baneful effects of germs and their toxins have been removed by the antitoxin. If such organs or apparatus are diseased practically beyond repair, particularly when mixed infection exists to a serious degree, anti-tubercle serum, if it does arrest the progress of the tubercle bacilli, can not directly repair the physical and physiologic loss of the tissues and their vitality, and death may ensue. Here is where accessory treatments are needed. If there be a mixed infection and serum is tried, a serum prepared specially for this condition is essential, such as the anti-streptococcus serum, which is produced on the same general principle as that for tuberculosis or diphtheria, and which is applicable in many of the usual mixed infections of any disease.

The aim of sero-therapy in tuberculosis then is, first of all, to counteract the effect of the toxin; second, to interfere with the progress of germ life; third, to restore or create anew in the organization physiologic recuperative powers, thus assisting in restoring the equilibrium of the faculties and the vitality of the organization as a whole. It is plain, therefore, that the serum treatment, like all others, promises most in the earliest stages.

From all that precedes in this paper, it would seem evident that in the treatment of consumption one should, first of all, pursue a wise course of management, and second, general and special treatments suitable to each case. Indeed, it may be stated as an

axiom, that all the hygienic influences that may be brought to bear on the system to improve its vital powers, should be directed to play their part.

GENERAL TREATMENT.

Climate is a point which most practitioners justly insist on being properly considered. Dry climate, free from the sand and dust storms should be chosen, if practicable. It may be hot or cold; both are beneficial in different classes of patients. It should be remembered that some tuberculous patients suffer much from heat or cold, according to their condition, and others the reverse. As a rule, emaciated, anemic patients prefer a warm temperature and stand the effects of cold very poorly, while those with more flesh and warmer blood thrive more or less under its influence. Altitude is not of so much consequence. Palm Lake, in California, which is below the sea level and yet exceedingly dry, is said to be the most beneficial locality for consumptives, while equally good results are claimed for the altitudes from 2,000 to 10,000 feet as exist in Colorado, New Mexico, Texas and some states of Mexico. The beneficial effects of climate are said to depend chiefly on the germicidal and stimulating properties of ozone and the purity of the air; therefore, it may be obtained, in a measure, in a room in a damp climate, in which such air may be to a degree created, by means of electricity and otherwise.

As a rule, patients are removed to suitable climates when it is too late, when they have cavities and are almost unavoidably doomed. On the other hand, those who do go to such climates usually return home too soon. Indeed, those who migrate to dryer climes for lung diseases should remain there if it agrees with them. They should make it their home. To return from such places to dampness usually means relapse and death.

Hydrotherapy is sometimes useful in consumption, particularly in the earlier stages, and more especially in those who have contracted the disease by contagion, without there being any inherited field for it. Then, salt rubs, all over the body, followed by a cool or cold douche or plunge of from one to five minutes duration, and then by a coarse towel friction, assist materially in stimulating the circulation and contribute to the well-being of the sufferer. These should be administered morning or evening.

Massage properly applied is another treatment of much utility, particularly in cases where there is indolence and a disposition to avoid exercise, even though the strength is sufficient to warrant it.

Dietetics are also of very great importance. Generally speaking the diet of consumptives should consist largely of animal albuminoids and heat producers of the most appetizing and nutritious character, the most easily digested and in the smallest bulk. While vegetable albumin is good, animal foods seem to be the most suitable, and among these tender beef, broiled, roasted or boiled, stands, in the order named, pre-eminent. Lamb, chicken and game come next. Fresh fish is also good. Vegetables that are agreeable to the patient and do not disturb digestion should be allowed as part of the diet, but not in sufficient quantity to appease hunger or supplant meats. So it is with sugars and fruits, the latter being preferable. Milk, cream and butter are advisable, if well tolerated. In case of poor appetite, the whites of two to half a dozen eggs, one to three or four times a day, at meals or between meals, constitute an excellent diet, supplying as it does, a large amount of albumin in a small bulk, usually digestible even by an impaired stomach. These may be given raw or in milk shakes or in the form of punches with a small amount of good sherry wine. Made dishes, fried articles of food, should be avoided. The excessive use of alcoholic stimulants is likewise contra-indicated, and so is tobacco.

SPECIAL TREATMENT.

First in line is the specific treatment; that form of therapeusis which aims to set interference in the way of microbic development. It may consist of prophylactic measures of the vaccinating order, or treatment by the action of immunizing and curative principles, based on the laws underlying immunity and recovery from infections. As vaccinating agents, the various forms of tuberculin may be used. Being poisonous principles of the germ of the disease, their effect is limited to the production of a mild kind of tolerance of the consumption germ, by the system of the being inoculated. Consequently, it is only in the very earliest moment of suspicion of tuberculosis that one may expect a cure by the use of such a preparation. Antitubercle serum, on the contrary, being the product with which nature herself often cures tuberculosis without the guidance of the human hand, may be used in all stages with perfect propriety and safety and with the assurance of at least having done one's duty in the application of medicine. As said before, it is in the earliest stages that the disease can be more readily arrested, but being an antitoxin it is applicable in all stages and under all circumstances, except the very rare exceptions in which heart disease or other idiosyncrasies exist, which preclude the hypodermic injection of albuminoids or salty preparations, and sometimes even of water.

In cases of pure tuberculosis, anti-tubercle serum may be administered hypodermically, in doses ranging from 5 to 6 ms. daily, 30 being the average maximum dose. The place of injection, when they are to be continued for some time, should be a locality where a heavy fold of the skin can be most easily lifted and the hypodermic needle plunged most deeply into the connecting tissue. I find the area in the back, towards the side, most suitable. See Fig. 1.

The untoward effects of serum injections are very uncommon, particularly if one is careful not to push injections too rapidly and in too large doses from the first. Occasionally, a local swelling occurs which may be reduced by the ordinary methods for such conditions. If precaution has been taken to disenfect the skin thoroughly at the point of injection, by washing the locality and then rubbing it with alcohol, or preferably formaldehyde, there is little chance of producing a swelling due to microbes, providing that the syringe and needle be thoroughly clean and free from germs of any kind. The kind of syringe that appears in Fig. 2 is most suitable. It is easily disinfected, is graduated with both systems; its needles are not so large as those of most instruments and therefore cause less pain. The serum itself is absolutely sterile. No one need fear infectious injury from that source, unless by serious carelessness germs are allowed to contaminate it.

Infrequently symptoms of arthritis develop, which

resemble very much the ordinary symptoms of rheumatism and which subside after suspending injections for a few days, and under the treatment for rheumatism. The occurrence of urticaria and other skin eruptions is not uncommon, and usually avoidable by progressive doses.

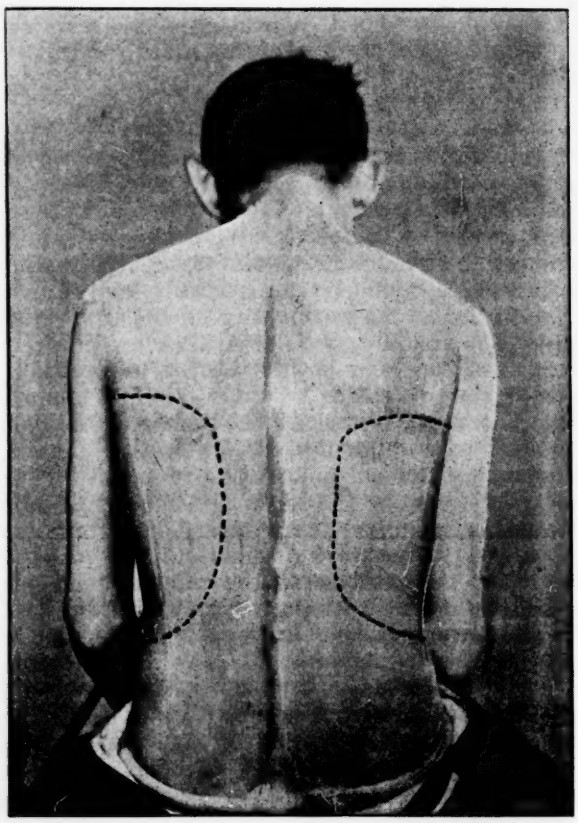

Figure 1.

The most striking, peculiar and perhaps most alarming of all the untoward symptoms of sero-therapy in any disease, is the strange and sudden interference with the circulation, manifested by dizziness, almost immediate cyanosis, and sometimes, more or less serious pain along the spinal cord, from the point of injection downward, including the nerve courses of the lower limbs, occasionally producing nausea and pain in the stomach. Sometimes these manifestations are followed by rigor. Fortunately, these results are exceedingly rare and never have proved fatal. Over one hundred thousand injections of serum antitubercle (Paquin) are recorded without a serious result. In

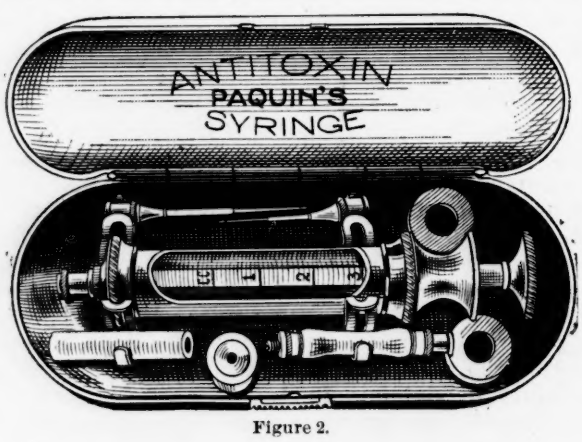

Figure 2.

such cases, I usually discontinue hypodermic medication and use instead rectal injections with special syringe, Fig. 3, which gives as good results in many cases, although it requires usually a larger dose. As treatment of these effects, I prescribe nitrate of strychnia, hypodermically.

In mixed infections, particularly where the germs of pus predominate and where the expectoration is largely made up of pus and broken down tissue, I use the anti-streptococcus serum as accessory treatment. I produce this serum under the same principle that underlies the production of all other antitoxins, namely, by the immunization of the horse, by saturating injections of the toxins and germ substance of the streptococcus. This is done by the method known as Marmorek's, somewhat improved. This serum and the anti-tubercle serum may be mixed or given alternately on alternate days.

As to internal medication, it must depend wholly on the existing conditions. In anemia and other conditions suggesting feebleness of the nervous system and circulation, proper reconstructive blood tonics and nerve stimulants, such as pepto-mangan and nitrate of strychnia, are desirable. As to cough, unless it is very aggravating and prevents sleep to a serious degree, I never use opiates. I usually administer, when absolutely needed, codein and terpin-hydrate.

It has been suggested that alteratives be used to assist in arresting the breaking down of tissue and glandular suppuration, etc., as is done in the treatment of syphilis. For that purpose, I have found a solution of iodin properly mixed with glycerin and some of the halogen salts, very beneficial. Iodin is credited, indeed, with having cured tuberculosis. The iodides are not good. They seem to destroy red blood corpuscles.

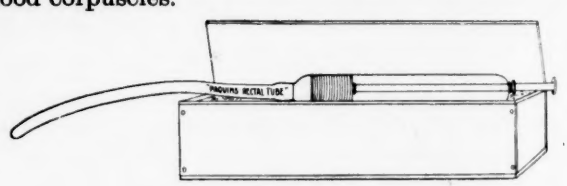

Figure 3.

As to inhalations, they should never be of an irritant character and, in fact, one should be very careful in their administration. In the early stages of tuberculosis most inhalations produce an irritation of the bronchi which is followed by a secretion that offers a good nidus for the development of germs. The inhaling ingredients containing the essence of pine needles, benzoin and such essences as are not irritant and are of a balsamic character, are most suitable. In cases with cavities, inhalations containing formaldehyde, are useful as disinfectants.

Electricity is also prescribed in tuberculosis. Both the galvanic and faradic currents have been used. The galvanic current is said to act by direct chemic action through the diseased organs, the poles being so placed as to pass the current through the affected parts. The benefits of this treatment are problematical, though sometimes they seem to be favorable. The faradic current is applied in a general way, as a stimulant of the general system.

Of recent date, so-called medicated electricity has been used in tuberculosis. It consists of treating the diseased portions by the application of the galvanic current with poles dipped in certain drugs.

Iodin has been chiefly used for this purpose, and it is said that the current carries with it through the diseased organs principles which tend to arrest the progress of tuberculosis.

In closing, I wish to draw your attention to an exceedingly important point. It is, that most every physician expects too much of sero-therapy in tuberculosis. I have never made extravagant claims for it. It can not perform miracles and should be used early. It is neither just to the patient nor to the treatment to apply it as a last resort, when everything else has failed and the condition of the patient is such that doom stares him in the face.

REPORT ON OXYTUBERCULIN IN THE TREATMENT OF TUBERCULOSIS.

BY J. O. HIRSCHFELDER, M.D.

SAN FRANCISCO, CAL.

SAN FRANCISCO, Nov. 20, 1897.

To the Editor:—I send you herewith a report on Dr. Hirschfelder's oxytuberculin, together with his notes upon the cases examined, which we hope you will publish in full in the JOURNAL. We are convinced of its efficacy and value, and urge its extended use. You will observe that it is not in any sense a secret nostrum, but has been placed legitimately before the profession. Yours truly, HENRY GIBBONS, JR., M.D.

Since the address delivered before the California State Medical Society in April, 1897, upon "Oxytuberculin" the investigations described therein have been continued both in the bacteriologic and clinical departments.

The results that had been obtained up to that time have been confirmed by further observations under the scrutiny of many of my medical brethren.

The laboratory experiments proving the inhibitory action of the oxytuberculin upon the bacilli tuberculosis have been repeated a great number of times with different modifications, but all teaching beyond doubt the certainty of the doctrine that oxytuberculin, even when greatly diluted with the culture medium most favorable for the germ, will prevent its growth. In all, forty-one series, of such culture experiments have been made by me and watched by my colleagues.

Continued treatment of many of the patients whose cases were reported at that meeting have shown that some of them have become entirely or nearly well, many have become much improved, while a few have grown worse or have died. A table of all of these cases, as well as of such as have begun treatment since that time, will be herein reported.

Believing it the duty of Cooper Medical College to investigate the value of oxytuberculin, the faculty of that institution appointed a committee for that purpose, consisting of most of the professors of that institution.

October 24, after the committee had carefully inspected the laboratory evidence, the cases whose histories will be reported in detail in this paper were presented in person to this committee together with stained slides of the sputa prepared before, during and after the treatment. The cases were carefully investigated by the committee in every direction, physical examination of the chest and laryngoscopic examination of the throat being made where it was found necessary.

At the conclusion of this investigation at which a number of medical gentlemen not connected with the college were present and who participated in its deliberations, it was decided that the committee fully endorses the value of oxytuberculin, but desires to formulate its verbal approval in a lengthy report which shall be presented at the next faculty meeting, to become a matter of permanent record.

It was stated to the committee that I did not underestimate the value of experiments conducted on animals, but that lack of facilities prevented me from conducting these in such a manner that their evidence, positive or negative, would be indubitable.

I stated that I considered it my duty to present all evidence collected, whether it be favorable or unfavorable, that it would not be proper to make a number of animal experiments and to select from these such only as gave favorable results, omitting others because the conditions under which they might have been performed were not such as to exclude accidents.

It has been my custom not to omit any observations that I have made bearing upon the subject, however unfavorable to my method the conditions may have been.

I stated that under the circumstances I deemed it wise not to enter upon the field of animal experiments, but to leave that department to those scientists who might be more favorably equipped for such researches.

The following are the cases that were presented to the committe:

Case 1.—F. A. A., merchant, aged 44; Jan. 15, 1896. No family history of phthisis. His wife died of tuberculosis last October, at which time he was subject to severe mental strain. For the past year he has been troubled with insomnia. For the past twenty years he has had occasional cough, with morning expectoration. Last October patient expectorated ℥ss of pure blood. During the past six weeks the cough has been worse; he has lost eleven pounds in weight and has had one night sweat. The rectal temperature varies from 99.2 to 100.4 degrees. Examination showed patient to be a fairly well nourished, very pale individual. Head shows no peculiarity. Cervical glands are slightly enlarged; the thorax is long, broad, well arched and deep; the right side is slightly flatter than the left; the right supraclavicular region is slightly sunken; both sides move equally in respiration; there is a slight dulness of the right apex, with faint bronchial respiration and a few râles; the area of cardiac dulness and heart tones is normal; the liver is 10 centimeters and spleen is not enlarged; the urine is normal, the spirometer test shows 3160–3230 c.c., and the hemoglobin 70 per cent. (Gowers' hemoglobinometer); the sputum contains large numbers of bacilli of tuberculosis; his weight is 153½ He was injected with oxytuberculin in doses of 5 c.c daily, and on January 30, that is, two weeks after the treatment had been begun, he had already much improved, his appetite being better and the patient feeling stronger. His cough was much less and the expectoration about one-third of what it had been before. His weight was 155, the hemoglobin 90 per cent.; at one examination no tubercular bacilli were found in the sputum. February 27 his weight had increased to 164 pounds and the spirometer showed 3260–3380 c.c. At four examinations of the sputum during the month no bacilli tuberculosis were found, and on one occasion only a few. For fifteen days previous to February 29 no expectoration had occurred and the patient felt much stronger. In March the evening rectal temperature reached only to 99.6, and on one occasion he coughed, raising a small quantity of phlegm, which contained a few bacilli. March 31 and April 20 no bacilli were found. May 23 he had a chill and the spleen was found to be enlarged. For this he was given quinin for a while, that being the only medicine he had received during the whole course of the treatment. June 4 was discharged cured, there having been neither cough nor expectoration since April 20. The physical examination made by me and by Professor Kerr of the Medical Department of the University of California showed absolutely normal condition of the lung, no dulness whatsoever being present. The patient returned to his work, has gained further in weight and at the present time feels and looks perfectly well, and has remained so continuously since he was discharged from treatment on April 20, 1895. His present weight is 174 pounds.

Case 2.—Mrs. E. G., age 30, student. June 9, 1896. No family history of phthisis. Patient was well until two years ago when she had la grippe with bronchitis; since then she has been

coughing. She went to Phoenix, Ariz., used antiphthisin and gained eighteen pounds. During this time the cough continued and bacilli had always been present in the sputum. Two weeks ago patient had an attack of croup. The temperature rose to 103 and remained there for four days.

Physical examination.—Patient is a well-developed, well-nourished, excessively pale individual; thorax moderately long, broad, well arched and moderately deep; dulness of the right apex posteriorly to the second dorsal vertebra; dulness of the left apex posteriorly to the first dorsal vertebra; dulness of both apices anteriorly to below the clavicle; bronchial inspiration and expiration of both apices loudest upon the right side; few consonant râles; area of cardial dulness normal, tones clear; liver not enlarged; spleen extends to the anterior axillary line; pulse feeble; spirometer 2,000 c.c.; hemoglobin 65 per cent. (Gowers); weight 155 pounds; large number of bacilli in the sputum; temperature normal. Injections of 5 c.c. daily were made until July 27. June 16, appetite decidedly better; 20, able to swim further than she had swam in a year; 27, looks and feels better, cough and expectoration less, weight 156½ pounds; July 3, very few bacilli; 20, no dulness of the lungs, vesicular murmur over the left apex, respiratory murmur is harsh over the right apex; 22, 5 mm. of sputum, very few bacilli; 27, weight 159 pounds, spirometer 2350 c.c.; hemoglobin 70 per cent., began with 10 c.c.; August 2, weight 159½; 8, weight 161½; 11, walked two miles, weight 162; September 17, raised small quantity of mucus, no bacilli; 30, weight, 166; October 7, few bacilli; 9, weight 165½; November 7, no bacilli, weight 167; 21, weight 168½; 26, few bacilli, weight 165; December 9, few bacilli; 23, weight 165, injected 30 c.c.; 29 expectorated for the first time in six weeks (2 minims), few bacilli; January 27, weight 162½, few bacilli; February 5, injected 20 c.c.; 15, no bacilli, 5 m. sputum; March 1, 10 c.c., weight 162½; April 6, no bacilli; 7, no dulness of the lungs, murmur vesicular, weight 163¼; October 20, no expectoration for many months, looks and feels well, both sides of the thorax move equally, no dulness of the lungs, murmur vesicular.

Dr. Rigdon reported at the meeting that he had examined Mrs. G. before treatment had begun and that a large number of bacilli had been present. He now found none. Both he and Dr. Farnum examined the patient before the committee and pronounced her perfectly well.

Case 3.—H. F. M., age 28, reporter; May 28, 1897. Paternal grandparents and two paternal aunts died of phthisis. Father had some lung trouble between 25 and 35. Well as a boy. At 20 weighed 196. Fall of 1890 and spring of 1891 had two attacks of pleurisy. In the fall of 1892 threatened with pneumonia. Was nearly salivated with mercury. Was in bed one week. Falls of 1893 and 1894 had two severe attacks of throat trouble, had cough for a week. In spring of 1896 had what was called pneumonia. In fall of 1896 had a cold, coughed and had pain in chest. Weight 168 pounds. In April 1897 bacilli were found in the sputum by Dr. Riley. Had cough, expectoration and night sweats. Weight 155. Coughed blood one week ago. Patient is a fairly developed, moderately well-nourished, pale individual; cervical glands slighty enlarged; thorax long, moderately broad, fairly arched, deep; flatness of the left apex posteriorly to the first dorsal vertebra of the right to the second dorsal vertebra; both anteriorly to and including the clavicle; bronchial inspiration and expiration of both apices; May 30, temperature, A.M., 98.5; P.M., 98.2. May 31, temperature, A.M., 98.2; P.M., 99.6; injected 1 mg. tuberculin (Koch); bacilli found in specimen made by Dr. Riley on March 27. June 1, temperature, 8 A.M., 98.2; 10, 98; 12 M., 98.4; 1 P.M., 99.2; 8:15, 99.2; 9 A.M., 99.4; injected 3 mg. tuberculin (Koch). June 2, temperature, 1 A.M., 99.4; 8, 98.4; 9, 98.4; 6:45 P.M., 100.6; 7:45, 100.6; 9, 100.4; 11, 100; has headache; June 3, temperature, 8 A.M., 98.6; 10, 98.6 injected 5 mg. tuberculin (Koch); 6 P.M., 101.2; 7, 100.8; 8, 100.6; 9, 100.2; 10, 100. June 4, temperature, 8 A.M., 99.2; 9:45, 99.6; P.M., 99.6; dulness more extensive and more intense; bronchial respiration is more evident; temperature normal; injected 5 c.c. oxytuberculin. June 5, feels better; injected 10 c.c. June 11, temperature 98.8 to 101. June 19, injected 20 c.c. June 22, no cough for a week; injected 10 c.c. July 9, injected 20 c.c. July 19, cough slight; weight 154¾. July 20, took dilute sulphuric acid by mistake. October 11, injected 10 c.c. October 22, no dulness of the lungs, murmur vesicular; weight 156½; feels well.

Case 4.—H. P., age 40, minister; May 6, 1897. Father died of miner's consumption. Well as a boy. For the past few summers patient has had attacks of diarrhea. Patient is a moderately developed, poorly nourished, pale individual; thorax long, broad, flat, shallow; both supra-clavicular fossæ sunken; slight dulness of the uppermost portion of the right apex; bronchial respiration of both apices, more marked upon the right side; heart normal; liver and spleen not enlarged; no bacilli in the sputum.

Injected 1 mg. tuberculin (Koch). May 27, 8 P.M., temperature 97.2; 9 A.M., 97.8; 10, 97.2. May 28, 6 A.M., temperature 97.6; 7, 95.2; 9, 97.8; 10, 96.6; 11, 96.6; 12 M., 98; 1 P.M., 99.2; 2, 98.6; 3, 99.6; 6, 99.8; 8, 101.2. Injected 3 mg. tuberculin (Koch). May 29, 3:30 A.M., temperature 101.4; 6:30, 100; 8, 99.8; 9, 100.2; 3 P.M., 101.4; 8:30, 101.4; 9:30, 100.2. Dulness of the right apex is more pronounced than it was and a dulness is found in the uppermost portion of the left apex, bronchial respiration is louder. May 30, 7 A.M., temperature 100.4; 8 100; 10, 98; 2 P.M., 99; 4, 99.8; 11, 98.8. May 31, 6:30 A.M., 98.2; 10, 97; 12 M., 97.8; 3 P.M., 99; 4, 99.2; 7, 98.6. Injected 6 mg. tuberculin (Koch). June 1, 6 A.M., temperature 99.4; 7, 99.6; 8, 99.6; 9, 101; 10:30, 101.4; 12 M., 102; 1:30 P.M., 102.4; 2:30, 102.2; 3, 102.4. 7, 102.6; 9, 102.2. Flatness of the left apex posteriorly to the first dorsal vertebra; flatness of the right apex posteriorly to the second dorsal vertebra. Loud bronchial respiration of both apices. June 2, 7:30 A.M., temperature 100.8; 8:30, 100.8; 9:30, 100.8; 11, 100.6; 12 M. 100.6; 2:30 P.M., 100.2; 3:30, 100.8; 8:30, 99.6; 10, 98.8. Injected 5 c.c. of oxytuberculin. June 3, 7 A.M., 99; 12 M., 98.4; 2 P.M., 99; 3:30, 98.5. 4:30, 98.9; 9, 99.1; 11, 100.6. Injected 10 c.c. Feels much better. Bacilli found in the sputum. June 4, morning 98.8, afternoon 98. June 5, cough and expectoration much better, feels better. June 7, morning 98.5, afternoon 98.4. Diarrhea better. June 11, morning 101, afternoon 102. Has tonsillitis; gargle ordered. June 13, morning 101.6, afternoon 103. June 14, morning 98, afternoon 98.6. June 19, feels well, no diarrhea. June 21–22, night sweats. July 6, injected 20 c.c. July 20, has diarrhea. August 13, has diarrhea still, ordered creta. August 14, diarrhea is much better. August 23, diarrhea is worse; ordered pulv. opii, plumbi acet. and tannin, each .065 gram three times a day. September 23, no diarrhea, temperature normal. October 1, no cough or expectoration. October 21, patient feels perfectly well. Examination of the chest shows absolutely normal conditions. No bacilli in the very small quantity of sputum raised.

Case 5.—T. O. P., age 25, April 23, 1897. No heredity. Began to cough in June, 1895; several weeks later had a slight hemorrhage. The cough and expectoration increased and were attended by fever, night sweats and loss of strength. He went to Arizona and improved, but since then the old trouble has continued. Bacilli found in 1893 by Dr. Frey of Washington. Patient is fairly developed, moderately well nourished. Thorax moderately long, broad, well arched, deep. Dulness of both to the first dorsal vertebra anteriorly to the clavicle; faint bronchial respiration of both apices; heart normal; liver and spleen not enlarged; weight 142½ pounds; hemoglobin 70 per cent. (Gowers); sputum contains a moderate number of bacilli; temperature, morning 99.1 to 102. Injected 10 c.c. oxytuberculin. May 27, temperature normal. July 6, feels better; 20 c.c. injected. August 11, small amount of mucus, no bacilli. September 23, 10 c.c. October 11, no bacilli, small amount of mucus. October 19, no dulness of the lung, murmur vesicular. October 22, Weight 142½ pounds.

Case 6.—Mrs. C. H., age 31, May 13, 1897. Maternal grandfather and one half sister died of phthisis. Had the usual diseases of childhood. Eight years ago had a hemorrhage; this was followed by a morning cough which persisted. Four years ago had a second hemorrhage and another three months ago. For the past two months had short breath, even while at rest, the cough and expectoration have been worse and she has had night sweats. Patient is a moderately developed and nourished individual; thorax moderately long, moderately broad, well arched, moderately deep; left side moves decidedly more than the right; dulness of the right apex posteriorly to the second dorsal vertebra, of the left to the first dorsal vertebra; dulness of the right apex anteriorly to the clavicle, of the left to 2 cm. above the clavicle; bronchial respiration of the right apex faint, bronchial of the left; râles heard throughout the right lung; area of cardiac dulness normal, tones clear; liver not enlarged; spleen decidedly enlarged; no abdominal tumor; abdomen not distended; urine normal; hemoglobin 60 per cent. (G.); weight in health 145 pounds, at present 129½; moderate number of bacilli; temperature, morning, 99.6, afternoon 100. Injected 5 c.c. oxytuberculin. May 19, injected 10 c.c. May 26, temperature morning 100.8, afternoon 98.8. Expectoration less. June 1, morning 99, afternoon 101. June 2, injected 20 c.c. June 5, morning 98.6, afternoon 101. June 7, weight 128½ pounds. June 16, coughs less and feels better. June 17, weight 125½ pounds. June 30, walked two miles. July 7, weight 127½ pounds. July 8, hardly coughed. July 19, very few bacilli.

temperature normal. August 17, trace of sputum, no bacilli. October 20, no dulness of the lung, murmur vesicular (confirmed by Dr. W. M. Thorne).

Case 7.—Miss N. R., aged 22, Oct. 2, 1895. Two cousins on the maternal side died of phthisis, it having been acquired from the father's side. Had the usual diseases of childhood. One year ago caught cold and has been coughing since then. Since April the cough has been worse and been attended by expectoration. The voice was clear formerly, at present it is husky.

Physical examination.—Ordinary weight 141 pounds, in July 124, on July 8, 133, September 24 145; large number of bacilli; spirometer 1700 c.c.; hemoglobin 60 per cent. (G.) Patient is a well developed, well nourished girl; cervical glands not enlarged; thorax long, broad, moderately arched, moderartely deep; right side moves slightly less than the left, is flatter than the left; flatness of the right apex posteriorly to the second dorsal vertebra, of the left to the vertebral prominence; flatness of the right apex anteriorly to the first interspace, of the left in its uppermost portion; bronchial inspiration and expiration of both apices, few râles of the right; area of cardiac dulness normal, tones clear; liver and spleen not enlarged; weight 139 pounds. Injected 5 c.c. oxytuberculin; temperature normal. October 14, appetite much better, cough less. October 15, injected 10 c.c. October 20, weight 141½ pounds. November 7, weight 143½. November 16, no expectoration for a week. November 21, weight 144½. November 30, no expectoration in three weeks. December 7, no cough in twenty-four hours. December 11, two sides of chest appear the same, no sinking of the supraclavicular fossæ, two sides move equally, no dulness of the lungs, pitch upon the right side is slightly higher, expiration slightly harder. December 12, 20 c.c. injected. January 20, no bacilli. March 17, 10 c.c. injected. March 24, raised sputum for the first time since the last note, contains a few bacilli. June 29, 10 c.c. injected. October 11, both sides move equally, no dulness of the lungs, murmur vesicular.

Case 8.—Miss S. D., age 22, April 2, 1896. Sister died of phthisis. Patient was well until two years ago, when she had a pulmonary hemorrhage. This was followed by a cough which persisted. Last Thanksgiving day had another severe hemorrhage; since then the cough has been worse and has been attended with expectoration, night sweats and dyspnea; Last Monday had another hemorrhage.

Physical examination.—Patient is fairly developed, moderately well nourished, pale, slightly cyanotic; cervical glands slightly enlarged; thorax long, moderately broad, fairly arched, moderately deep, slight scoliosis; left side moves less than the right; flatness of both apices posteriorly to the first dorsal vertebra; flatness of both apices anteriorly to the clavicle; bronchial inspiration and expiration of both apices with consonant râles; area of cardiac dulness normal, tones clear; liver and spleen not enlarged; spirometer 600 c.c.; hemoglobin 75 per cent. (G.); urine normal; bacilli in the sputum; average morning temperature 99.4, evening 100.5. April 13, weight 122 pounds. May, 1896, average morning temperature 98.5, evening 99. May 4, weight 120¾. May 28, cough and expectoration increased. June, 1896, average morning temperature 98.5, evening 99. June 9, no bacilli, feels stronger. June 11, has not expectorated for three days, weight 118¾. June 18, weight 119. June 28, weight 119, no cough or expectoration. July 1, is able to work, little cough, weight 119½. July 13, weight 117¾. July 21, working, feels well; 5 c.c. injected. July 28, weight 118; 10 c.c. injected. August 3, weight 117. August 17, spirometer 1900 c.c., hemoglobin 75 per cent.; slight depression of the left clavicular region, none of the right; two sides move equally on respiration; at the uppermost portion of the right apex the pitch is higher than the left, but no dulness can be detected; respiratory murmur vesicular, expiration harsher than at the left apex; weight 116⅓. August 19, weight 118. August 27, no appetite, ordered strychnia .0027 gram three times a day. September 8, raised 1 c.c. mucus, the first in three days. November 2, no bacilli, has a little cough and expectoration. November 16, weight 113. December 1, 20 c.c. injected. Jan. 12, 1897, has pain in the chest. February 2, no expectoration for a month, weight 112. February 18, 10 c.c. injected. March 25, weight 113¼. April 2, no expectoration in three months. May 15, comes every other day. June 30, comes once a week. October 20, no expectoration for many months, two sides move equally, no dulness of the lung, murmur vesicular.

Case 9.—M. L., age 23, school teacher; Dec. 12, 1896. Mother and paternal uncle died of phthisis. Had the usual diseases of childhood. At 14 caught cold. Since then has coughed at intervals. Has shortness of breath on exertion and has had night sweats lately, period occurs every three weeks.

Usual weight 126 pounds, three months ago 117. Patient is well developed and fairly nourished; cervical glands very slightly enlarged; thorax long, moderately broad, moderately arched, moderately deep; flatness of both apices to the first dorsal vertebra, anteriorly of both to below the clavicle; bronchial respiration and consonant râles of both apices; throughout both lungs râles are heard; area of cardiac dulness to second rib, median line of the sternum to fifth, intercostal space to mammillary line; a murmur is heard at the apex that disappears during inspiration; liver and spleen not enlarged (examination confirmed by Professor Kerr, Professor Clinical Medicine, University of California, Medical Department); spirometer 1250; weight 117½; arytenoid cartilages slightly swollen; no bacilli in the sputum; temperature 99.8. Injected 10 c.c. January 9, injected 20 c.c. January 12, weight 119½. January 13, afternoon temperature 101. February 8, feels well, no cough, no expectoration; stop injection. April 10, has continued to improve, feels better than she has felt in two years, weight 121¼; two sides of chest move equally; no dulness of the lungs, murmur vesicular. October 4, feels well, has had a little inflammation in the throat below the surface of tonsil, scarified it and ordered peroxid, 1 to 6. October 22, weight 123¼. Patient looks and feels perfectly well, no dulness of the lungs, murmur vesicular. Dr. Barkan examined patient during the meeting and reported normal oral cavity. Epiglottis and vocal chords, true and false, healthy in color and texture; arytenoid cartilage and interarytenoid space normal. Patient speaks clearly and attacks the tone well, no secretion.

Case 10.—Mrs. G. F. C., age 19; Aug. 10, 1897. Father had phthisis. Patient was well, as a girl, mature at 14, has not been strong since, coughed at that time and at times since. Coughed up blood several times last summer, the last time since then having been last week. Patient has been getting short of breath for the last three months. Weight last spring 130 pounds, January, 1897, 118, present weight 109. Patient is well developed, moderately nourished, pale; thorax long, moderately broad, fairly arched, moderately deep; both supra- and infra clavicular fossæ sunken; left side moves slightly less than the right; flatness of both apices posteriorly to the second dorsal vertebra, of left anteriorly to the second rib, of right anteriorly to below the clavicle; bronchial respiration of the right apex, amphoric respiration of the left apex with swishing râles; area of cardiac dulness normal, tones clear; liver and spleen not enlarged; moderately large number of bacilli; temperature morning 99.2, afternoon 102. Oxytuberculin was injected daily. August 16, cough less. August 19, feels better. August 21, stronger, cough and expectoration less, temperature normal. August 23, hemoglobin 65 per cent. (G.). August 28, cough very much less, expectoration less and feels stronger. August 30, feels very well. September 16, appetite better, moderate number of bacilli. October 16, appetite very good, weight 108¼. October 18, two sides move equally, dulness of both apices posteriorly to the first dorsal vertebra, right anteriorly to the clavicle, of the left to the two cm. below clavicle, bronchial respiration of the right apex, amphoric of the left, few râles. An examination made by the committee confirmed the very marked improvement that had been made in her case.

Case 11.—T. H. W., age 37; June 16, 1896. No heredity. In 1877 had chancroid; has had gonorrhea; been using cigarettes for thirty years; used alcohol to excess; has been coughing for a long time, this has grown worse during the past year, at times he has raised blood-tinged mucus; two weeks ago had a profuse hemorrhage and has had night sweats for many years. Patient is poorly developed, illy nourished, color moderately good, cervical glands not enlarged; thorax long, moderately broad and well arched, moderately deep; two sides move equally; dulness of both apices posteriorly to the third dorsal vertebra, right anteriorly to the second rib, of the left to and including the clavicle; loud bronchial respiration of both apices with consonant râles, mucus râles over other parts of the lungs; area of cardiac dulness normal, tones clear; liver 15 cm. Spirometer 3800 c.c., hemoglobin 70 per cent., urine contains pus; large number of bacilli in the sputum. June 18, Professor Kerr confirmed the examination; weight 145¼ pounds; temperature morning 98, afternoon 101.6. Injections of oxytuberculin were instituted and very soon improvement occurred. June 26 it was noted that the cough was better than it had been in months, and by July 5 the temperature became normal and has remained so to the present. August 10, a few bacilli were found in the sputum. September 23, the patient expectorated a little blood, but otherwise no increase of unpleasant symptoms, so that by December 17 only 4 c.c. of jelly-like mucus was expectorated in the twenty four hours. December 29, no bacilli could be found in the sputum. January 19, patient complained of rheumatism

in the shoulders, for which salicylate of soda and hot baths were used. By January 30 he was entirely recovered from this slight ailment. March 2, a very small number of bacilli were found in the sputum. March 18 he caught cold but had no rise of temperature, coughed up a very small amount of blood, in which bacilli were found. April 2, no bacilli were found in the sputum, nor have any been found since that time. At the present time the patient is perfectly well and strong, the most careful examination made fails to reveal the slightest sign of the disease of the lung, either to me or any of the six other physicians who have examined him.

Case 12.—Miss G. P., age 18. Has been having cough for one year with profuse expectoration, night sweats and hemorrhages. First presented herself July 3, 1896. Weight 104¼ pounds. Patient is poorly developed, moderately well nourished, very pale; thorax long, moderately broad, flat, shallow; left side decidedly flatter than the right, moves very little on respiration; dulness on right side to first dorsal vertebra, anteriorly to and including the clavicle; dulness of the left apex posteriorly to the sixth dorsal vertebra, anteriorly to the second rib; bronchial respiration of the right apex and amphoric respiration of the left; temperature morning 102.5, afternoon 105. Treatment with injections of oxytuberculin was begun September 30. Weight 122¾ pounds. Temperature after October 1 normal with an occasional rise of temperature to 101. November 4, weight 125¾. November 14, very few bacilli present. November 21, weight 127½. March 4, patient took cold and went to the country, returning on the 25th in a very much worse condition than she had been since she first presented herself, weight being 112¾ and the temperature ranging as high as 102. Treatment of oxytuberculin was again instituted and improvement began. April 9 a moderate number of bacilli tuberculosis were found in the sputum. By April 24 the temperature became normal and has remained so since. When presented to the committee it was found that the left side of the thorax was slightly flatter than the right. The left side moves slightly less than the right in the upper part. No dulness whatsoever of the right lung. Respiration vesicular. In the left lung dulness was found posteriorly to the first dorsal vertebra and anteriorly to the second rib, amphoric respiration was heard in this region, but very few râles. Her weight was 125 pounds, and no bacilli were found in the sputum.

Case 13.—C. H. W. Was sent to me Jan. 22, 1897, from the Throat Clinic of the Cooper Medical College with the diagnosis of acute tuberculosis laryngitis, with the following report:

Left cord does not move. Cartilaginous portion narrow, membranous portion rounded and pearly white. Left arytenoid cartilage somewhat edematous, edema of the arytenoid having much increased in the last few days.

Patient was found to be moderately developed, poorly nourished, somewhat cyanotic, with dulness of the right apex to the third dorsal vertebra, of the left to the second; anteriorly of the right to the second rib, of the left to the first intercostal space. Bronchial respiration and râles of both apices, amphoric respiration below the right clavicular region; large number of bacilli in the sputum. Temperature, afternoon, 101.2; weight 129½ pounds.

Patient had profuse expectorations, was dyspneic and had numerous bacilli in sputum.

Administration of oxytuberculin was instituted January 22, and a few days later he reported that he slept better and felt better; temperature, P.M., 100.4. From that time to the present the temperature has never risen above the normal. February 2, he had a hemorrhage. February 13, the laryngologic clinic reported the larynx better, and from that time on a continued improvement in the condition of the larynx occurred. October 21, a large number of bacilli were found in the sputum. Dulness of the left apex was found to the first dorsal vertebra; bronchial respiration; no dulness of the right was found. There was very little cough, the expectoration being only one-half as much as it had been when he first presented himself. Patient had the rosy appearance of health and had no shortness of breath. His weight, however, was only 128½ pounds.

An examination by Professor Barkan made at the time of the meeting gave the following report: Epiglottis healthy, true and false vocal cords of good color and texture. Left cord does not move as well as right toward the medium line of phonation. Left arytenoid slightly thickened. Voice clear.

Case 14.—J. P. A.; was admitted to the City and County Hospital July 15, with the following history: He had been well with the exception of stomach and bladder trouble until one week ago, when he suddenly became short of breath. His legs began to swell and he passed bloody urine for the same length of time. He was found to be cyanotic and dyspneic, with general anasarca. Dulness of the right apex was to the second dorsal vertebra; bronchial respiration. The sputum contained bacilli of tuberculosis in large numbers. In the bloody urine bacilli tuberculosis and a moderate quantity of albumin were found.

The case was diagnosed as acute miliary tuberculosis, but so little expectation of accomplishing anything in the case was felt that an examination of the blood for bacilli tuberculosis was, unfortunately, not made. Injections of oxytuberculin were begun and the patient rapidly improved, though high fever continued for a long time, but with the last two weeks has entirely disappeared. August 17 the patient was able to walk around the wards, and the urine was no longer bloody, nor has it been so at any time since. August 28, his weight was 133 pounds. September 25, his weight was 135. October 2, his weight was 138. October 6, after much search a few bacilli could be found in the sputum and in the urine only a trace of albumin, but no bacilli. October 19, patient became attacked with sciatica, for which he was blistered and confined to his bed. His weight on October 23 was reduced to 134 pounds.

In this case the gradual improvement had been observed by the class of medical students at Cooper Medical College, who saw him from time to time in the wards.

In the subjoined table sixteen cases that had been treated early in the course of the investigations with oxytuberculin heated only thirty hours and giving less favorable results have been omitted.

FOURTH STAGE.

No.	Name.	Days Treated.	Bacilli.		Cured.	Much Improved.	Slightly Improved.	Unchanged.	Worse.	Dead.
			Before.	After.						
1	D. A. C.	172	Large	Moderate				1		
2	C. F.	200	Large	Moderate			1			
3	T. J.	104	Large	Not examined						1
4	G. A. K.	59	Large	Not examined						1
5	J. M.	407	Large	None	1					
6	J. M.	365	Large	Hardly any		1				
7	B. M.	459	Large	Very few		1				
8	W. R. P.	59	Large	Large						1
9	P. P.	285	Large	Moderate		1				
10	G. P.	295	Large	Moderate		1				
11	D. H.	180	Large	Moderate		1				
12	G. C.	65	Moderate	Moderate		1				
13	H. D.	58	Small	Small		1				
14	C. F.	77	Large	Not examined				1		
15	J. D.	44	Large	Large			1			
16	M. H.	47	Large	Not examined						1
17	Lester L.	96	Large	Not examined					1	
18	R. L.	32	Large	Not examined		1				
19	C. M.	112	Large	Moderate		1				
20	J. R.	168	Large	Large			1			
21	E. W.	63	Large	Not examined						1
22	C. W.	173	Large	Very few		1				
23	J. B. M.	38	Large	Not examined		1				
23					1	11	3	2	1	5

THIRD STAGE.

1	D. B.	26	Moderate	Not examined				1		
2	S. D.	300	Large	None	1					
3	E. E.	37	Large	Not examined		1				
4	A. G.	126	Moderate	Large		1				
5	F. J.	326	Large	None		1				
6	M. L.	118	Large	Large				1		
7	J. M.	141	Large	Hardly any		1				
8	S. M.	461	Large	Moderate		1				
9	A. M.	30	Large	Not examined		1				
10	C. M.	22	Moderate	Not examined			1			
11	R. M.	333	Large	Moderate		1				
12	H. P.	285	Large	None		1				
13	T. P.	33	Large	Not examined				1		
14	L. T.	40	Moderate	Not examined				1		
15	F. A. S.	254	Moderate	Moderate			1			
16	C. H. W.	42	Large	Large		1				
17	M. W.	182	Moderate	Few		1				
18	T. H. W.	350	Large	None	1					
19	T. M.	250	Large	Moderate		1				
20	F. R. D.	300	Large	None		1				
21	W. H.	280	Large	Moderate		1				
22	M. W.	120	Small	Small		1				
23	P. S.	40	Large	Moderate		1				
24	J. D.	30	Large	Large			1			
25	T. T.	80	Large	Moderate		1				
26	H. C.	30	Large	Moderate		1				
27	C. H.	148	Moderate	None	1					
28	J. M.	54	Moderate	Few		1				
29	W. W.	180	Large	Large		1				
29					3	19	3	4		

SECOND STAGE.

1	E. G. . .	288	Large	None	1	. .	. .	. .	. .	. .	. .
2	W. M. . .	75	Moderate	Not examined	. .	1	. .	. .	. .	. .	. .
3	N. R. . .	120	Large	None	1	. .	. .	. .	. .	. .	. .
4	E. S. . .	108	Large	Moderate	. .	1	. .	. .	. .	. .	. .
5	Father S.	99	Moderate	None	1	. .	. .	. .	. .	. .	. .
6	V. C., 1..	100	None	None	1	. .	. .	. .	. .	. .	. .
7	C. V. . .	90	Moderate	None	1	. .	. .	. .	. .	. .	. .
8	T. L. . .	180	Large	None	. .	1	. .	. .	. .	. .	. .
9	R.W.R., 2	38	None	None	. .	1	. .	. .	. .	. .	. .
10	O. P. . .	137	Moderate	None	1	. .	. .	. .	. .	. .	. .
11	H. P. . .	111	Moderate	None	1	. .	. .	. .	. .	. .	. .
12	W. D. . .	112	Few	None	. .	1	. .	. .	. .	. .	. .
13	H. M. . .	101	Few	None	1	. .	. .	. .	. .	. .	. .
14	M. P. . .	36	None	None	. .	1	. .	. .	. .	. .	. .
14					8	6	. .	. .	. .	. .	. .

1 Through an oversight sputum records were not made until one month after treatment had begun.
2 Bacilli tuberculosis had been found previously by Dr. Fraser.

FIRST STAGE.

1	F. A. . .	134	Moderate	None	1	. .	. .	. .	. .	. .	. .
2	M. L. . .	15	None	None	1	. .	. .	. .	. .	. .	. .
3	W. Z. . .	305	None	None	1	. .	. .	. .	. .	. .	. .
4	R. W. R.	106	None	None	1	. .	. .	. .	. .	. .	. .
4					4	. .	. .	. .	. .	. .	. .

GENERAL SUMMARY.

Stage.	Total No. Treated.	Cured.	Much Improved.	Slightly Improved.	Unchanged.	Worse.	Died.
Fourth stage	28	1	11	3	2	1	5
Third stage	29	3	19	3	4	. . .	. .
Second stage	14	8	6	. . .	. . .	. . .	. .
First stage	4	4	. . .	. . .	. . .	. . .	. .
Total	70	16	36	6	6	1	5

When in this table it is stated that a patient has become well I mean that bacilli tuberculosis have been absent at repeated examinations running over a long period of time, that the patient feels well and strong, and above all that physical examination of the chest does not reveal any signs of the disease. Any case not filling all of these requirements has provisionally been classed among those who have improved. It has been my purpose to place the most stringent demands upon the treatment.

In administering the remedy needles not less than one-half inch in length have been used so that the oxytuberculin might be injected well under the skin.

443 Geary Street.

A CLINICAL STUDY OF TUBERCULOUS CASES TREATED WITH THE NEW ANTIPHTHISIC SERUM T. R.

(FORMULA OF FISCH.)

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Serum therapy has been so extensively used that scarcely a well informed person can be found who does not entertain an opinion either for or against it.

However, the principles underlying this method of medication, the nature of toxins and antitoxins, their mode of preparation, administration and action are very imperfectly understood.

A great variety of opinions are held both by the profession and the laity concerning the effects of this treatment in tuberculosis. Many of these opinions however are based upon no firmer foundation than that of prejudice.

For some time past I have used with my tuberculous patients, a serum prepared by immunizing the horse with Koch's old tuberculin. I have obtained from this product very satisfactory results in several cases.

Soon after the introduction of Koch's new "tuberculin T. R.," I tested its utility on a few well selected cases of tuberculosis. A short time later I was informed by Dr. Carl Fisch of St. Louis that he was immunizing horses with the new "tuberculin T. R.," hoping to be able to furnish a serum with more potent antitoxic properties than those possessed by the old serum. This at once appealed to me as being the most rational therapeutic agent yet proposed for the treatment of tuberculosis.

As is well known, Koch's old tuberculin contains only the toxins secreted by the bacilli. If the use of the old tuberculin on the horse could produce a serum capable of bringing about the satisfactory results which I had obtained in the cases tested by it, I felt very confident that the new "tuberculin T. R."—being a more complex toxin, containing not only the toxins secreted by the bacilli, but also those contained in the tissues of the bacilli themselves—if used to immunize the horse would produce a more complex antitoxin, which would not only be an antidote for the toxins secreted by the bacilli, but also for those contained within the substance of the germs; in other words, possessing both antitoxic and bactericidal properties.

At this time I was honored by a request from Dr. Fisch to test the new product upon a series of tuberculous cases. I accepted the invitation and commenced the work as soon as the horses were considered immunized and Dr. Fisch had tested the serum upon animals. The following report therefore is the first account giving the results obtained with this serum upon patients.

Before proceeding with the report it will probably be well to clearly define the principles underlying immunization; and, furthermore, to come to a clearer understanding of the rôle played by toxins and antitoxins in bringing about this condition.

It is the nature of toxins when administered to an animal to stimulate the organism to a greater production of antitoxins. This is known as active immunization.

On the other hand, the antitoxins produced by a healthy animal may be administered to an organism possessing a diminished supply of these antitoxins. The result thus obtained is known as passive immunization.

Moreover, since every living organism is endowed with the ability to generate protective substances known as antitoxins; yet this ability is possessed in variable degrees by different individuals, according as they are in a normal or diseased state, or according to the species to which they belong.

Therefore if the antitoxin supply of any organism becomes diminished by disease, either in quantity or quality, it has already been shown that an effort may be made to overcome this deficiency by one or the other of the foregoing methods of bringing about artificial immunization.

By the active method a toxin is used for the purpose of stimulating the organism to a greater production of antitoxins. But it will be readily seen that in weak persons this method would be simply an effort to increase the functional activity of an organism that is already overworked.

While, on the other hand, by administering antitoxins produced by a healthy or immunized animal to one deficient in these products the weaker organism

will be temporarily supplied with that which it is not able to prepare for itself; and during this period instead of being stimulated to a still greater activity it will have an opportunity to rest and recuperate.

This is exactly the result which I have observed by administering the "antiphthisic serum T. R." to tuberculous patients.

The following is the report of my first ten cases treated by this new serum:

Case 1.—Mrs. N., age 30, native of Kentucky.

Family history.—Sister died of tuberculosis at 20, sick two years; four months later a brother died of tuberculosis at 32, sick five years; the mother having nursed the son and daughter through their sickness showed evidence of tuberculosis a short time before their death, and died of the disease eighteen months later. Also, one aunt had tuberculosis.

Personal history.—Present trouble began four years ago. Former weight 137, lost gradually until her weight was reduced to 80, slowly improved until she reached 103 pounds. In June, 1897, a cough and expectoration commenced and she came to Colorado.

Physical condition.—Upon examination one month after arriving in Denver, I found a small area of dulness over the upper lobe of left lung with moist râles in the apex on forced inspiration; frequent pains in the lung; cough and morning expectorations; afternoon temperature 99½; weight 110. Slept poorly, appetite moderate; weak, easily exhausted and very susceptible to cold.

Treatment.—I commenced treatment with Koch's new "tuberculin T. R." on August 6, continued for two weeks, increasing the dose from $\frac{1}{500}$ mg. to $\frac{150}{500}$ mg. At the expiration of two weeks weight reduced from 110 to 106½ pounds. A marked reaction developed under an increasing dose in the form of a distinct chill. August 25 treatment was changed to "antiphthisic serum T. R.," commencing with ⅓ c.c. The dose was slowly increased to 1 c.c. At the end of one week under the serum she had gained two and one-half pounds. Felt better and stronger and slept better.

Reaction.—Patient experienced the first reaction on the ninth day in the form of a tired feeling with an inclination to sleep most of the time. During second week cough and expectoration ceased, appetite improved, slept better and gained two pounds. Temperature normal at the end of third week. At the expiration of six weeks of the serum treatment patient felt a constant improvement. The pain had disappeared from the lung, cough and expectoration had ceased, râles had disappeared and there was a gain of seven and one-half pounds. Patient much stronger, riding a bicycle, and was much better than for three years. Patient discharged cured. Treated with Koch's old tuberculin without a reaction. Dose never exceeded 1 c.c. Temperature never more than one degree above, but more frequently subnormal. One month after stopping treatment patient had gained two pounds and continued to improve.

BLOOD STUDY: TABLE I.[1]

Date, 1897.	Differential Percentages.				
	S. L.	L. L.	Trans.	Phag.	Eos.
August 13	20	8	2	68	2
August 21	24	13	3	53	7
September 20	32	7	0	58	3
October 4	34	6	1	56	2
November 5	27	10	0	61	2

August 6–23 gave "tuberculin T.R." August 25 to October 4 gave "antiphthisic serum T.R." Last blood examination made November 5, one month after stopping treatment.

Results.—Small lymphocytes almost double in number, also an increase in the number of eosinopilous cells and decrease in amount of cell disintegration. One month after stopping treatment the relative percentages adjusted themselves to almost normal.

Case 2.—Mr. H., age 22, single, nativity, New York.

Family history.—Father died of tuberculosis.

Personal history.—Has always been delicate. Had typhoid fever two years ago. Has been a close student for several years. Present trouble commenced last spring while in college. Began with a severe cold, pain in left lung, cough and expectoration, loss of weight and strength. Came to Colorado in June through the advice of his physician. Remained in the mountains during the summer, sleeping in a tent, living in the open air, nourished by the best of food, but under no treatment. Gained in weight, appetite improved, and in many ways felt better, but the cough and expectoration continued, and occasionally a pain in the left lung.

Physical condition.—Patient consulted me September 4. A physical examination revealed slight dulness over upper lobe of left lung, with moderate localization infiltration, and a few fine râles on forced inspiration. Temperature 98, pulse 84, weight 143 pounds.

Treatment.—Commenced the "antiphthisic serum T. R." beginning with ½ c.c. On third day increased to ¾ c.c. Continued the latter dose for five days. During the third and fourth days temperature rose to 99, but soon dropped to normal and remained so during the month.

Reaction.—The first evidence of reaction developed at close of first week. The left axillary glands became tender and moderately enlarged, and left shoulder stiff. Patient felt tired and experienced a tendency to sleep much of the time. These effects disappeared after the third day. During the reaction the appetite was not impaired. Immediately after the reaction appeared, the cough and expectoration became less. End of second week cough and expectoration had ceased. At the close of first month patient had gained three pounds and felt stronger each day. Pain disappeared from lung, chest expansion had increased three-fourths of an inch, râles had disappeared and dull spot was clearing. Patient discharged with no evidence of the disease remaining. During the month no treatment used except the serum and lung gymnastics. Maximum dose 1 c.c. A second reaction did not appear.

BLOOD STUDY: TABLE II.

Date, 1897.	Differential Percentages.				
	S. L.	L. L.	Trans.	Phag.	Eos
September 11	17	5	1	74	3
September 18	24	9	0	60	7
September 25	27	8	0	60	5
October 2	27	9	0	60	4

Case 3.—Miss S., aged 34; nativity, New York.

Family history.—Mother died of tuberculosis at 64, sick six months; one sister at 20 sick six months; five cousins on mother's side between 20 and 30, and one aunt at 60.

Personal history.—Present trouble began four years ago. Had pleurisy in right side. Cough soon developed, accompanied by almost constant pain in right lung. Soon afterward patient came to Colorado. Former weight 114 pounds, weight on arriving in Colorado three years ago 93 pounds. Improved slightly in Colorado, but cough and pain in right lung persistently increased. Continuing very susceptible to climatic changes, and did not gain strength.

Physical condition.—Examination August 15. No râles detected in either lung. Dulness and slight consolidation over upper portion of right lung, with impaired breathing. Temperature 99 ⅕; pulse 92. Weight 103 pounds. In connection with this case there was also well marked acne involving the face and back, which had existed since puberty without yielding to treatment.

Treatment.—Began "antiphthisic serum T. R." September 11, and continued two months. Initial dose ¼ c.c. At the end of second week was giving 1 c.c. Temperature during first week persistently remained one degree above normal, but fell to normal during second week.

Reaction.—The first reaction developed early in the second week. Axillary glands enlarged and tender on both sides. Face flushed in evening after taking the serum. Felt tired and inclined to sleep much of the time. For a few days while the reaction was most marked, shoulders were stiff much the same as after taking a cold. Following the reaction of the second week improvement was marked; slept better; appetite improved, cough and expectoration diminished; looked and felt better and strength increased. Cough ceased entirely at end of second week, and pains in lung disappeared. Appetite greatly improved. Also an unexpected evidence of improvement developed. At close of the second week the acne which had been so persistent on face and back commenced to disappear. By the end of third week the face was entirely clear and there has been no return. Patient continued to feel better and gained in strength to the close of the treatment at the end of two months; feeling better than at any time since commencement of her trouble. Lost three pounds during first month which were regained during second month. No treatment used except serum. One month after stopping treatment patient feeling well with no evidence of the disease to be found.

[1] The following classification of leucocytes is used in this study with the approximate normal percentages for each: Small lymphocytes 26; large lymphocytes 8; transitional 1; phagocytes 64; eosinophilous 1. The percentages in the tables represent an average of 500 leucocytes.

BLOOD STUDY: TABLE III.

Date, 1897.	Differential Percentages. S. L.	L. L.	Trans.	Phag.	Eos.
August 15	25	5	0	68	1
November 6	33	6	0	57	4
November 13..	29	5	0	63	3
November 18..	30	5	0	61	4

Case 4.—Mr. M., age 32, nativity, Ohio.

Family history.—Father died of tuberculosis at 45, sick three years. Also father's mother at 30, sick six months.

Personal history.—Present trouble commenced one year ago. Had severe pneumonia involving left lung. A cough existed previous to the pneumonia and increased afterward, accompanied by morning expectoration. Very susceptible to climatic changes. Former weight 145, present weight 133.

Physical condition.—Small dull area over central portion of left lung. Pain on pressure, also distinct rough breathing on forced inspiration, but no râles detected. No bacilli, temperature 99.4, pulse 98. This case can not be said to be one of active tuberculosis. But the family and personal histories accompanied by his physical condition justified the suspicion of a strong tuberculous predisposition which was confirmed by a blood study. I advised the patient to try the "antiphthisic serum T. R.," for the purpose of bringing about artificial immunization before he had advanced to the so-called "active stage" of the disease.

Treatment.—Commenced the serum October 16, beginning with ¼ c.c. Increased the dose from ¼ c.c. to ½ c.c. during first week with no reaction. Gained two pounds. Temperature reduced to normal. During second week dose increased to 1 c. c. Slight reaction experienced. During third and fourth weeks gave a daily dose of 2 c.c. Improvement marked. Temperature dropped to normal or subnormal. At the end of one month patient is in an excellent condition, feeling better, much stronger; cough and expectoration ceased, pain left the lung, appetite improved, gained five pounds. Patient discharged feeling better than for years.

BLOOD STUDY: TABLE IV.

Date, 1897.	Differential Percentages. S. L.	L. L.	Trans.	Phag.	Eos.
October 14..	21	5	0	67	7
November 6	24	4	1	64	7
November 17..	25	4	0	66	5

Case 5.—Miss R.; nativity, Massachusetts.

Family history.—Maternal uncle died of tuberculosis at 30, sick three months. Maternal aunt at 28, sick less than three months. Paternal grandmother has intestinal tuberculosis. Father has intestinal troubles.

Personal history.—Has always been delicate. Present trouble commenced two years ago in the form of a severe bowel trouble, which has not yielded to treatment. Very feeble endurance. Takes cold quickly, which always manifests itself in an increase of the bowel trouble. Patient also has a severe form of acne.

Physical condition.—Lungs normal. No cough or expectoration. Tenderness over bowels with more or less tympanitis. Temperature 99, pulse 82, weight 116. I suspected intestinal tuberculosis and advised the "antiphthisic serum T. R."

Treatment.—Commenced October 13, with ¼ c.c., increasing the dose until 2 c.c. were given at the end of fourth week. At the end of first week temperature was reduced to normal, and during a further treatment of six weeks it fluctuated between normal and one degree below.

Reaction.—At close of first week reaction was experienced in the form of a tenderness and swelling of axillary glands, stiffness in shoulders, a tired feeling and a tendency to sleep. The acne also showed improvement at the end of the first week, and at the close of six weeks had almost disappeared. The general condition of patient improved as the treatment progressed. Bowel trouble gradually improving, weight increased five pounds. Patient stronger and less susceptible to climatic changes, appetite improved, gained in strength and in every way better than for two years. Treatment continued.

BLOOD STUDY: TABLE V.

Date, 1897.	Differential Percentages. S. L.	L. L.	Trans.	Phag.	Eos.
September 27.	10	13	1	75	1
October 23.	19	6	1	73	1
October 30..	23	9	1	64	3
November 8	24	7	1	65	3
November 13.	19	3	1	71	6
November 20..	21	7	1	61	10

Case 6.—Mrs. F., age 24; nativity, Indiana.

Family history.—Maternal and paternal grandmothers died of tuberculosis, also a nephew at 19, sick one year, and all cousins on both sides at ages ranging between 17 and 21.

Personal history.—Present trouble developed after an attack of grippe. Fever, cough and expectoration followed. Had two slight hemorrhages. Bacilli were present. Has had cardiac weakness, occasional albuminuria, asthma and chronic bronchitis. Has spent most of her time in Colorado for several years with very little improvement.

Physical condition.—No actual lung lesion found, but general state of health feeble. Troublesome cough with very little expectoration. Much pain in lungs. Takes cold very easily, accompanied by an increase in the foregoing symptoms. Bacilli have disappeared from sputum since coming to Colorado.

Treatment.—Patient placed under the "T. R. serum" October 19, commencing with ¼ c.c. A slight reaction developed from the first dose. Dose was slowly increased. At the end of first week was giving ½ c.c. No severe reaction experienced, but several hours after giving the serum, patient felt tired and sleepy accompanied by marked flushing of the face. Invariably felt better after each reaction. End of fourth week appetite improved, slept better, gained in weight, felt better, and cough had ceased. Temperature continued throughout the month at normal or subnormal. Patient gradually improving. Feels better than for six months. Takes 1 c.c. with little reaction. Treatment continued.

BLOOD STUDY: TABLE VI.

Date, 1897.	Differential Percentages. S. L.	L. L.	Trans.	Phag.	Eos.
September 29.	19	12	1	66	2
October 19..	30	9	1	57	3
November 13.	29	11	1	55	4

Case 7.—Mr. C., attorney, aged 28, nativity Nova Scotia.

Family history.—Father died of tuberculosis at 39, sick eleven years. All cousins on the father's side died of the disease between 18 and 26.

Personal history.—Present trouble commenced with grippe in February, 1895. Previous health good but had been overworking. Cough, expectoration and night sweats commenced at this time. Returned to office after five weeks, but cough and expectoration continued. Aphonia developed and continued until the following July. During July had two hemorrhages. Examination of sputum revealed bacilli. Weight reduced from 148 to 136 pounds; came to Colorado in October, 1895. Has gained since coming to Colorado. Aphonia has disappeared, strength increased and gained in weight, but cough and expectoration continued, and often tinged with blood.

Physical condition.—Patient was examined November 1; fine râles detected in upper lobe of right lung, over which was a small area of dulness; cough troublesome, expectoration moderate in amount; bacilli present.

Treatment.—Patient commenced the "antiphthisic serum T.R." November 3. During first week increased the dose from ¼ c.c. to ½ c.c. The first reaction developed on fourth day. Felt sleepy all afternoon after taking the serum. During the remainder of the week slept the greater part of the time. By the end of the first week appetite much better than for years; felt stronger. During second week dose increased from ½ c.c. to 1 c.c. Early in the second week the axillary glands became tender and slightly enlarged; felt tired, weak and sleepy. This reaction soon disappeared and patient felt much better and stronger. During third week dose increased to 1½ c.c., very little reaction experienced; cough no less, but easier, feeling better each day; sleeping better and much stronger. Gained two pounds; pain in lungs diminishing. Treatment continued.

BLOOD STUDY: TABLE VII.

Date, 1897.	Differential Percentages. S. L.	L. L.	Trans.	Phag.	Eos.
November 1	17	8	2	69	4
November 11..	20	14	0	58	8
November 18..	20	2	1	69	8
November 23..	22	12	0	58	8

November 3 commenced the serum. Blood examination revealed the distinct characteristics of incipient tuberculosis. November 11, revealed marked improvement; the small lymphocytes showing an increase and the eosinophilous cells doubling in number.

Case 8.—Mr. H., aged 42, married, nativity Ohio.

Family history.—Two uncles and one cousin on father's side died of tuberculosis.

Personal history.—Engaged in educational work for years. A hard worker, but enjoyed good health until three years

ago. For years had taken cold readily, always followed with a cough, expectoration and soreness in lungs. During spring of 1896 over-worked and health commenced to fail. Came to Colorado and consulted me for a diagnosis. Lungs revealed no evidence of tuberculosis; a blood study, however, revealed much cell disintegration and marked alteration in the relative percentages of the various types of leucocytes. I gave a diagnosis of marked tuberculous predisposition and advised patient to rest for one year and remain in Colorado. The case was reported as No. 34 in my article on "The Diagnosis of Tuberculosis from the Morphology of the Blood" (*Med. Record*, Oct. 5, 1896). Patient declined the advice given and returned East the last of August and commenced his school work. Cough and expectoration commenced the last of December; lost weight and strength and in March, 1897, broke completely down with what physicians called "pleuropneumonia." Confined to his room five weeks. Cough, expectoration and high fever continued. Came to Colorado the second time last July.

Physical examination.—Both lungs very seriously involved; bacilli abundant; marked variation in daily temperature varying from from 102½ to 104½, pulse 110. Former weight 138, present weight 111. Cough troublesome, expectoration profuse, night sweats, diarrhea, extreme dyspnea, poor appetite and sleep.

Treatment.—Gave "tuberculin T.R." for one month, increasing dose from $\frac{1}{500}$ mg. to $\frac{350}{500}$ mg., with very little if any improvement during the month. Gave "antiphthisic serum T. R." during the second month. Increasing the dose from ½ c.c. to 3 c.c; slight improvement in all symptoms except temperature and pulse; cough and expectoration less, appetite improved a little and slept better, but these were only for a short duration. During the last week of treatment I used "antistreptococcus serum" (Fisch) in connection with the "antiphthisic serum T. R.," giving each on alternate days. After the first dose of the "antistreptococcus serum" the temperature fell from 101⅗ to 99⅕. For three days the temperature remained between 99 and 100, being the lowest point reached for more than six months. Patient became gradually weaker, pulse more rapid and appetite less. During the two months of careful treatment patient rapidly failed. Treatment stopped. Patient returned East; lived one month.

BLOOD STUDY: TABLE VIII.

	Differential Percentages.				
Date, 1896.	S. L.	L. L.	Trans.	Phag.	Eos.
August 3..	15	12	0	71	2
July 22, 1897..	7	9	0	84	½
August 2.	5	4	0	91	0
August 10	6	9	0	85	⅓
August 18	10	9	0	81	0
September 14.	4	8	0	88	⅓

Case 9.—Mrs. D., age 37; nativity, Pennsylvania.

Family history.—Very good. No tuberculosis on either side.

Personal history.—Present trouble began about two years ago. Patient lived in a double house, a tuberculous patient living in the adjoining apartment. Our patient received daily visits from her neighbor who was careless about her sputum. Expectorating profusely on floors and sidewalk. Our patient in sweeping her apartments inhaled the dust, not knowing the danger from the dry sputum.

At this time she was exhausted with other troubles and very susceptible to the germ. The above influences existed for five months before she noticed any trouble. It first developed by a sensation of a foreign substance in her throat. This increased and a cough soon developed, followed by expectoration. Six months ago aphonia developed and one month later she came to Colorado.

Physical condition.—Left lung very seriously involved; cavity and coarse and fine râles throughout the lung. Cough excessive, expectoration profuse, bacilli abundant. Poor appetite, insomnia, aphonia, diarrhea and amenorrhea. Temperature 101.8 degrees, pulse 120, and scarcely able to go to meals. Former weight 139; present weight 114.

Treatment.—Commenced July 29 with Koch's "tuberculin T. R.," from $\frac{1}{500}$ mg. to ½ mg. at the end of three weeks. During this treatment the temperature was reduced to 99 and pulse to 104. Bowel trouble slightly better, voice and appetite improved and slept better, but cough and expectoration had increased and night sweats appeared. August 25 changed to "antiphthisic serum T. R." At the end of three weeks patient felt much better and stronger, appetite improving, slept better, night sweats ceased and gained two pounds. But cough and expectoration had not improved and temperature was fluctuating between 98.4 and 100.6; bacilli abundant. I then resolved to use "antistreptococcus serum" in connection with the "antiphthisic serum T. R.," giving each on alternate days, increasing the dose gradually until at the end of two weeks more, 3 c.c. of each were being administered. Patient felt no bad effects from the increased dose except slight rheumatic pains in joints. Appetite and sleep both increased. Patient felt better and was gaining in strength. Coughed less at night. At this time a despondent mood came over patient and she stopped all treatment. Omitted treatment almost one month. During this time all symptoms increased and upon re-examination I found the left lung involved throughout and the trouble extending to the other lung. Temperature 101, pulse 120, patient weaker and evidently had lost ground. Patient commenced treatment again, taking the "serum," but very irregularly, omitting it almost half of the time. On November 19 there was no evidence of actual improvement. Cough and expectoration no less, temperature and pulse somewhat less, appetite and sleep better. Treatment continued. Subjective symptoms apparently better.

BLOOD STUDY: TABLE IX.

	Differential Percentages.				
Date. 1897.	S. L.	L. L.	Trans.	Phag.	Eos.
July 6.	10	9	1	78	2
August 5	13	6	0	79	2
September 22.	15	9	0	72	4
November 14..	10	10	1	77	2
November 22..	14	6	1	75	4

July 29 to August 23 used "tuberculin T. R." August 25 to September 17 used "antiphthisic serum T. R." August 17 to 28 used "antiphthisic serum T. R." and "antistreptococcus serum on alternate days." September 28 to November 14 omitted treatment. November 14 commenced "antiphthisic serum T. R." again.

Case 10.—Mr. C., age 25, single, nativity Pennsylvania.

Family history.—Maternal grandmother died of tuberculosis. All of her sisters died of tuberculosis. Mother died of tuberculosis at 47; sick four years. Confined to her room one year before her death.

Personal history.—Has never been strong. First evidence of present trouble commenced six years ago. Was almost constant attendant of his mother during the last year of her sickness and slept in the same room. His trouble commenced three months after commencing to care for his mother and nine months before her death. Commenced by taking a severe cold, in mid-summer, without any apparent cause. Cough, expectoration and night sweats soon followed. Former weight 135. Has had several slight hemorrhages. Came to Colorado three years ago.

Physical condition.—Physical examination revealed distinct râles over all parts of right lung. Left lung not involved. Cough troublesome, expectoration moderate, bacilli abundant, poor sleep, very poor appetite, temperature normal or slightly above, weight 115½.

Treatment.—Commenced "antiphthisic serum T. R.," September 23, with initial dose of 0.5 c.c. Reaction: More tired and stupid than usual. September 24 gave 0.75 c.c. Reaction: Back around puncture became swollen and painful. Axillary glands tender on both sides. Rheumatic pains in both hands. Cough diminishing. Temperature 99. September 26 gave 0.5 c.c. Axillary glands tender and swollen. Tenderness in joints. Slept six hours in the afternoon after taking serum. September 27-28 gave 0.5 c.c. Same reaction continuing with no new developments. September 29 omitted the serum.

Second week.—September 30. Temperature normal. Axillary glands less painful. Appetite improving. Felt better in every way. Gave 0.5 c.c. Reaction well marked. Slight rheumatic pains in joints. Felt chilly in the evening. Axillary glands less sensitive. During the remainder of the second week reduced the dose to 0.25 c.c. and gave it on alternate days. Patient recognized a marked improvement, slept better and appetite improved. Temperature normal. Circulation better. Reaction less, marked improvement, except considerable infiltration around punctures. Lost two pounds.

Third week.—Same dose continued. Respiration deeper, circulation stronger. Appetite slowly improving. Did not tire so easily, slept better, felt stronger, gained two pounds. Temperature normal.

Fourth week.—Same dose continued, followed by a slight improvement.

Fifth week.—Commenced daily treatments of 0.25 c.c. Very little reaction except felt tired, with a tendency to sleep. Cough much improved. In every way felt better.

Sixth week.—Increased the daily dose to 0.5 c.c. A slight instantaneous reaction followed the first injection of 0.5 c.c. The punctures continued to produce distinct infiltration and

tenderness. Toward the end of sixth week increased the dose to 0.75 c.c. Patient slept all night and awoke hungry. Temperature continued normal notwithstanding the injection set up marked inflammation around the punctures. Patient looking better and feeling stronger. The results were so satisfactory from the increased dose that on November 2 I increased it to 1 c.c. This was followed by excellent results, except that it produced marked inflammation. Each injection not only setting up a distinct swelling and tenderness at the seat of puncture, but also increasing the inflammation around the previous punctures on the opposite side of the back. The first injection of 1 c.c. (November 2) set up such acute inflammation that it quickly developed into a small abscess. Consequently during the seventh week the serum was discontinued. On November 7 the abscess was opened. Except for the pain caused by the abscess the symptoms were very encouraging. During this week the cough and expectoration were much less than at any other time during the previous treatment.

Eighth week.—Patient much improved and insisted on beginning the serum again. Cough almost ceased except in the morning on arising, also very little expectoration. Encouraged by the marked improvement I began the serum again (November 11) with 0.25 c.c. Slowly increased the dose each day until 1 c.c was reached at the end of the eighth week with no unpleasant reaction. Symptoms rapidly improving. Patient tolerating the injection much better than before the abscess formed. Pulse reduced from 108 to 90. Temperature normal. I commenced this case knowing it to be a desperate one. The patient had very little hope of being benefited. It has required careful study but the results have more than rewarded me for the care and anxiety devoted to it. The blood study has been unusually interesting. Additional treatment used in Cases 8, 9 and 10: Gude's peptomangan and Fairchild's panopepton. Careful lung gymnastics used in all cases. Case continued under observation.

BLOOD STUDY: TABLE X.

Date, 1897.	Differential Percentages.				
	S. L.	L. L.	Trans.	Phag.	Eos.
April 30	14	9	1	75	1
September 23	16	9	1	71	3
October 9	17	9	1	66	7
November 3	10	7	1	71	11
November 6	10	6	1	79	4
November 7	17	6	0	75	2
November 13	17	6	0	72	5
November 20	17	7	0	67	9

September 23, commenced "antiphthisic serum T. R." October 9, improvement commencing. November 3, inflammatory leucocytosis. November 6, abscess forming. November 7, after opening the abscess. November 13, improving. November 20, much better, stronger and coughs less.

Blood Study.—The blood study made in the foregoing cases has constituted no small part of the labor connected with this research. The interesting blood changes observed during the progress of the treatment is a strong proof of the curative effect produced by the serum. The variation in the differential count as given in the tables were by no means the only characteristics observed in the blood. There are also many grades of cell disintegration, as well as many grades of imperfect cell development in such blood. But it is not my purpose at this time to discuss blood appearances in tuberculosis, since I have already attempted this in a former paper.[2] I have however used this means of study to aid in forming a more accurate conception of the true condition of the patients when beginning the serum and to aid in following the progress of the cases while under the treatment. The blood study in these cases shows conclusively that distinct and uniform blood changes progressively develop as the disease advances. While on the other hand equally as important changes develop as the cases return to the normal state. I have observed that in those cases in which improvement was taking place the first evidence was detected in the blood. These changes are as follows and are shown in the foregoing tables: *a*, an increase in the percentage of young cells or small lymphocytes; *b*, a decrease in the percentage of phagocytes; *c*, an increase in the percentage of eosinophilous cells; *d*, a decrease in the amount of cell disintegration.

On the other hand, when the disease was advancing the foregoing symptoms were reversed, as seen in Case 8. Therefore, this study demonstrates that the cases treated with the serum show that the deterioration of the blood is diminished and that there is an added stimulus in the direction of increasing cell genesis and constructive cell metabolism. In other words, the two conditions which universally increase with the advance of the disease are observed to diminish; and with beginning convalescence they show a tendency to return to the normal.

Indispensable factors.—The skill required for the proper preparation and administration of serum is scarcely yet appreciated. Serious consequences may result unless the products are prepared according to accurate scientific principles, by those who care more for a reputation of conscientious work than for commercial profit. While on the other hand the improper administration of a pure serum may bring about results which may unjustly be attributed to the serum. The greatest care in the administration of an impure or decomposed serum will not prevent the development of unpleasant results. Hence, for satisfactory results in serum therapy there are two indispensable factors: Pure products and cautious administration.

Physiologic effects.—I have experienced not a little satisfaction in the fact that there have been no unpleasant or dangerous results from the administration of this serum. It, however, produces reactions which are as characteristic of the physiologic effects as are obtained from the use of quinin or any other therapeutic agent, and if carefully and properly administered I have found no occasion for alarm.

Symptoms of slow reaction.—An increase in the dose brings about physiologic effects which are not uniform in all cases. These may briefly be enumerated as follows: A tired sensation; a desire to sleep much of the time; rheumatic pains involving the joints; tenderness and swelling of axillary glands; chilly sensations, which generally appear several hours after receiving the injection; inflammation at seat of puncture which usually is slight and ceases after first or second week; an erythema, which is not severe and soon disappears; a flushing of the face after the injections, sometimes immediately, but more frequently several hours later; occasionally a tingling sensation is experienced over the surface of the body several hours after taking the injection, and when it occurs it is generally early in the treatment or at a time when the dose is being increased. Headache seldom or never occurs.

Instantaneous reaction.—A sudden reaction sometimes occurs after an injection of any serum. It is probably due to a too sudden and forcible injection of the fluid, especially when the point of the needle terminates in dense and non-elastic tissues.

The needle produces more or less injury to capillaries or veins. And since a compressed liquid naturally tends to escape through channels of least resistance, the pressure of the tissues upon the serum directly forces it into the blood current through the rupture made in the blood vessels. When this occurs an instantaneous reaction of more or less intensity may be produced. This varies somewhat in different

[2] Medical Record, Sept. 5, 1896, March 13, 1897. Journal of the American Medical Association, Oct. 23, 1897.

persons and at first may cause alarm, but soon subsides without leaving any deleterious results. When the serum is thus forced directly into the blood stream the full physiologic effect is suddenly experienced. While on the other hand if the serum is injected slowly into the loose tissues, absorption takes place slowly, and the sudden reaction is avoided.

During the course of my observations I have suspected another cause for these sudden reactions. I have observed that they are not constant. Many patients do not experience them at any time during the treatment, some very slightly, and others to quite a marked degree. I have observed that those who have experienced them have done so both under a gradually increasing dose, and under a continuous uniform one. I have not yet observed them early in the treatment. When they are experienced, it is generally after the patient has been under the treatment for some time, or after rapidly increasing the dose.

These observations therefore have caused me to suspect an accumulative action of the serum. Case No. 10, has been the only one to experience them to a marked degree. And after each reaction patient has invariably felt good results.

Rules for administering the serum.—With a view of obviating the sudden development of the physiologic effect, I have taken the precaution that the point of the needle passes entirely through the skin into the elastic cellular tissues, and am also careful to force the serum very slowly into the tissues. If at any time an unusual pressure should be required to expel the serum we may be certain that the point of the needle is in dense and non-elastic tissue, which should be a guide for the exercise of caution.

The following are a few of the precautions which I have used in the administration of this serum. 1, I usually begin with the minimum dose of $\frac{1}{4}$ c.c.; 2, the dose is slowly but progressively increased until a reaction is produced; 3, when the reaction is well-marked no further injections are given until it has diminished. and then a smaller dose is commenced and again slowly increased; 4, in very succeptible patients, when a marked reaction is produced by a small dose, the treatment should be given on alternate days until a tolerance is established, otherwise it is given daily; 5, in advanced cases or in those who react quickly to the treatment, it is desirable to proceed with caution; 6, with such cases I take the precaution of placing them in the recumbent position while giving the injection, and at the same time give them a moderately strong current of electricity.

Limit of tolerance.—The limit of tolerance varies in different patients. I have observed that those in the last stage of the disease with a high temperature tolerate large doses, and those well advanced in the disease with low temperature, usually respond to very small doses.

Ultimate effects of the serum—These may be summarized as follows: 1, it improves the appetite and sleep; increases the weight and strength, lowers the temperature, lessens the pulse rates, diminishes the cough and expectoration, stops night sweats and lessens the disposition to take cold; 2, it increases the production of young cells in the blood, diminishes cell disintegration, and increases the percentage of eosinophile cells.

Deductions.—From the effects obtained from the new serum, in the foregoing cases, covering all grades of the disease, I make the following deductions; 1, in early incipiency the disease can be cured and convalescence rapidly established; 2, in cases possessing strong family and personal histories pointing to a marked tuberculous disposition—the early use of the serum T. R., will bring about a rapid improvement, diminishing the susceptibilty to the germs, and by this means prevent such cases from passing into the more active stage of the disease; 3, cases of advanced tuberculosis without mixed infections, show encouraging results; 4, cases in the last stage with mixed infections receive temporary benefit, the progress of the disease being partially held in check, but it is doubtful if a permanent cure can be established except, in rare cases; 5, a blood study is not only a reliable means of showing the condition of the patient, but also the progress of the treatment.

After making a careful study of the effects of the antiphthisic serum T. R., I am frank in stating that thus far it has given most gratifying results.

My results upon patients correspond very closely to those obtained by Dr. Carl Fisch, in his excellent laboratory experiments, reported in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, Oct. 30, 1897.

The cases which I have had the opportunity to study demonstrate that if a diagnosis is made early in the development of the disease, this serum offers bright hopes of bringing about a recovery; and, furthermore, cases known to possess a strong tuberculous predisposition may, if the serum is made use of sufficiently early, increase the immunity, and prevent the disease from passing into the stage of active disintegration.

If the results continue to be as gratifying as those which I have already obtained, the antitoxic and bactericidal properties of the serum in tuberculosis in man can not be questioned.

Having received such excellent results from the antiphthisic serum T. R., on all cases commencing the treatment early, I believe they justify the conclusion that, if cases with a known tuberculous predisposition should take the treatment while they exist as such, it will check the disease from further development. If this point becomes fully established it will bring about a revolution in the treatment in tuberculosis; the treatment then being directed with as much energy toward preventing as toward curing the disease.

One other point should receive a passing notice. I have reference to the advantage of climate in connection with the antiphthisic serum T. R.

The climate alone, in nearly all of the foregoing cases, relieved the symptoms after the patients came to Colorado. The improvement, however, was marked but not complete, many arriving at a certain point then cease to improve.

The climate in such cases exhausts its power and they either remained apparently stationary or begin to lose ground.

Hence, I believe that the effects produced upon the majority of the foregoing cases show conclusively that the best means for bringing about continuous and permanent improvement in tuberculous cases, is to be found in the new antiphthisic serum T. R., aided by a properly selected climate.

205 Jackson Block.

Pilocarpin in Pneumonia.—Lidmanowski reports eleven cases of pneumonia arrested by the second or third day, passing at once into convalescence, by immediate treatment with large doses of pilocarpin, dose 0.1 gram a day. He ascribes its favorable action to the energetic leucocytosis produced.—*Wratsch.*

PERSONAL OBSERVATIONS IN PULMONARY PHTHISIS.

Read before the Clinical Society, Dec. 7, 1897.

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ELIZABETH, N. J.

After an experience of twenty-five years, I desire to present some conclusions, the result of my own personal observations in pulmonary phthisis. I use the term advisedly, on account of its comprehensiveness, including as it does all that has been known and taught from Laennec to Koch.

The preparatory or premonitory conditions which almost invariably exist in all cases of phthisis do not receive the attention they deserve.

Let us apply the principle of early recognition of these little departures from functional and organic integrity, to the disease in question.

They deserve to live, who by careful attention to the various functions of the body, keep the various mechanisms of their various organs in harmonious rhythm.

Ignorance does not pardon in the eye of the law, and the penalty must be paid even though it may cost the life.

Max Nordau says "the degenerate must die." An inheritance of conditions which must inevitably end in an early death, is the result of ignorance, crime and fatuitous circumstances, many, if not all, of which might have been avoided.

To educate the public out of this phenomenal darkness, and where they can not be educated, to legislate them out of it, is the duty of the medical profession. Out of the complex phenomena of a disease which presents such a diversity of symptoms and conditions, it has been my aim to determine what is the first appreciable departure from health, the most constant symptom, discernible by patient and physician alike, which would lead us to suspect that the individual in question is in danger of ultimately becoming tuberculous. Many of the disagreements between physicians as to the natural history of diseases have arisen from the fact that they have observed from different standpoints and from different starting points; the latter being of much greater importance than the former, for the standpoint may be changed from day to day but the starting point can only be changed as a confession that the *fons et origo* had not as yet been discovered.

A few years ago I arrived at the conclusion that the first symptom (aside from general malnutrition), is a slight cough or hack repeated two or three times on an average, on reclining, at night. This cough antedates the morning cough by a considerable period, varying in length in different subjects. It is a little thing, but its etiology is important beyond measure. It is *the diagnostic symptom*, which having been found and understood by the physician, gives him an enormous advantage in the prevention and cure of phthisis.

The patient believes himself to be in fair health. He has no pain, no cough at any other time, no disturbance of any other function, is only a little below par, and will sometimes deny that he has any cough, until told by the members of his family that they have repeatedly heard him cough, when he lies down at night. This same evidence has been repeated to me so many times that I do not doubt its significance, and I consider it the test question "does he cough on reclining?" If there is a symptom prior to this, I have been unable to find it. The etiology of it, I believe to be this, viz: that the mere change of position from the erect to the recumbent, has produced an immediate change in the circulation of the blood and air in the pulmonary structure, disturbing the equilibrium which always exists in healthy chests, controlled by the natural tension through the vaso-motors. A temporary passive congestion or hyperemia is produced thereby, due to an insufficient expansion of the finer tubes and vesicles, the blood pressure being out of proportion to the air pressure, and the coats of the vessels being over-distended or varicosed by want of support, the blood currents come under the influence of an extraneous force, *gravity*, which never occurs in vessels whose coats are normal, except by complete inversion of the body or as in the hypostatic congestions of long illnesses.

The change to the recumbent posture immediately causes an increase in the distending force within the blood vessels, and a decrease in the amount of air in the tubes and cells. As a result of this, a backward flow of blood into the bronchial vessels, and a sensation of fulness or tickling is perceived in the region of the head of the sternum.

The cough that occurs is nature's own effort to remove this fulness, which it accomplishes at first with only a few long breaths and coughs. If this pathologic condition is not relieved early, it continues until it requires stronger and more prolonged effort in the act of coughing to remove it. The objective symptoms of this condition are found in a slightly diminished resonance of a higher pitch, slight depression under the clavicles follows this, and still later the mucous click or catarrh of the apex. Mensuration shows a deficient expansion above normal, often below, except in women, from the effects of corsets and other tight clothing, which they invariably insist is not tight, and can only be convinced by ocular demonstration with the tape line. (The tape line should never be out of the physician's pocket, except when he is using it.)

Ausculation reveals a still more important point; a diminished or absent true respiratory or vesicular murmur. This symptom, I consider of greater importance than all the other objective symptoms, and it is invariably found somewhat before and always associated with the gravitation cough.

In the wondrous mechanism of the lungs we find the ramifications of the pulmonary artery intertwining among the air cells, forming a close and delicate network of capillaries, in the interspaces, supported by the highly elastic structure of the air cells. Elasticity is one of the most distinguishing characteristics of these cells. They are in health never empty, and in death can only be emptied by force. With every inspiration, both air and blood are aspirated into the lungs. When air is in excess we have emphysema; when blood is in excess, we have congestion, which being continued indefinitely brings on in time an endless chain of pathogenic conditions which must end in death, if not relieved by proper systematic treatment. Of emphysema, I need only say that the emphysema which results from spasmodic bronchial asthma, is antagonistic to phthisis.

Now, I believe that all the influences which dimin-

ish nervous and muscular force, and their number is great, such as sedentary pursuits, the dark side of life, residence in low and malarial regions, clothing that prevents a perfect action of the diaphragm and chest walls, dissipation, indoor occupations, worry and many others, these all tend to shorten the respiration and diminish its depth; as a result of this a gradual dilatation of the capillaries takes place, in that part of the lungs where the vesicles are least distended a passive congestion is produced, and thus is furnished a soil that will nourish tubercles.

The force of the heart's action, often increased by excitement, by stimulants of any kind, by muscular effort, by normal tension of vessels altered by chilling the cutaneous surface, and other causes aid in producing a dilatation of the pulmonary capillaries, and thus the blood currents coursing through vessels which have lost their contractility come under the influence of this extraneous force, *gravity*.

It is to this immediate influence that we are to look for the explanation of this cough on reclining, which we may distinguish as the *gravitation cough*. This condition is so important that it seems deserving of a distinctive name in our nomenclature of disease symptoms.

Upon the correct explanation of this cough depends the entire treatment of phthisis whether bacillary or non-bacillary. It is as easily gotten rid of even when the conditions have gone so far as to produce cough in the morning with expectoration and pain in the subclavicular and interscapular regions from congested pleuræ. These last two stated conditions occur in the order in which they are mentioned, the cough in the morning with expectoration as a result of a longer continued gravitation blood pressure during sleep, producing exudation into the bronchi, which is expectorated on arising. This exudation may not come on until weeks or months have elapsed since the gravitation cough began.

The pain in the pleuræ comes on still later as a result of the damming up of the blood currents and vaso-motor paresis, producing congestion in that tissue.

I have associated these three symptoms or conditions, before speaking of treatment, because they are all removed by *mechanical expansion*. The function of respiration, unlike those of other vital organs, is placed under the control of the will, whereby the integrity of the pulmonary apparatus may be preserved, by maintaining a perfect function of these organs. This is indeed an important safeguard. It is impossible to maintain a perfect organ without a perfect function. This principle applies to all of the voluntary organs of the body, and more especially to the breathing apparatus, exposed as it is to the vicissitudes of climate, and dangers of infection by bacteria.

Jacobi has truly said that the "tubercle bacillus never attacks healthy tissue," and I believe it to be equally true, that when they have found a lodgement in the tissues of the lungs, we have as yet no drug that can be administered, by way of the stomach or through the blood by hypodermatic injections of sufficient strength to destroy them. We counteract the effect of their toxins and increase the resisting power of the tissues against their encroachments, and there our drug power ends.

I have used the term *mechanical expansion*, by which I mean a regular systematic *natural* method of increasing the capacity of the lungs, maintaining a normal function and regaining it when lost. It is common among physicians to recommend mountain air to their phthisical patients. The benefit of this procedure is beyond question, but of the great multitude of cases, there are comparatively few, who are able to profit by this advice. The science of climatology is one of great interest, inasmuch as at the present date it is capable of showing better results in the treatment of phthisis, than the more fashionable science of bacteriology or any other. We know that there are regions almost entirely exempt from phthisis, others where it is more commonly found, and others where it prevails in great abundance.

Solly, who is recognized as an authority in the science of climatology, says "consumption is most prevalent in proportion to the temperature and humidity of the climate: 1, in damp cold climates; 2, in damp hot climates; 3, in dry hot climates; 4, in dry cold climates; while in curative effects it is true in reverse order. This indicates in a general way, that dryness is a benefit, and humidity obnoxious to phthisis." He qualifies the statement by saying that "apparently, humidity apart from other factors, does not in itself produce phthisis." It is my opinion that our phthisis cases, here, do better in the winter even with our sudden changes of temperature and humidity, than in the warm, debilitating, moist air of midsummer.

In regard to barometric pressure, Solly says "that statistics show an almost steady rise in the percentage of improvement, from the ocean to the altitudes, and from this we learn, that as a rule, the consumptive improves the further he is removed from the sea, as shown in the contrast of percentage of improvement in a large series of cases; sea voyages 54 per cent.; low land climates, 57 per cent.; dry desert, 65 per cent.; altitudes, 77 per cent. Therefore, while the desert of Arizona will cure more cases of consumption than the sea air of the coast, yet it will not cure as large a proportion, as will the mountain air of the highlands."

Hirsch has shown, "that decreased barometric pressure tends to confer more or less immunity from phthisis. The marked decrease which is present in all high altitudes has been domonstrated by Egger, and others, to have a remarkable effect upon anemia, by increasing the amount and quality of the red blood corpuscles and hemoglobin; that the blood changes are brought about, not by the quantities of dryness, sunlight, or other climatic factors in high or other climates, but by the diminished barometric pressure, was proved conclusively by the classic experiment of Regnard, who, at sea level, kept a rabbit in a bell glass under diminished air pressure, equivalent to the atmosphere at 6,000 feet elevation for a month; when the rabbit was removed, it was found that the same blood changes had taken place, as occured in rabbits transferred from sea level to a climate at 6,000 feet elevation." This experiment, instructive as it is, brings up another question, would the same changes in the blood have been produced in an animal breathing the same rarefied atmosphere of 6,000 feet with the density of atmosphere pressing upon the external surface of the body as exists at the sea level. That is, was the improvement due to the rarefied air alone which the animal breathed, or was it due to this combination with the diminished air pressure upon the surface, or was it due to the decreased pressure on the external surface alone?

There are those who claim the improvement in the blood is due to breathing rarefied air. I do not know of experiments having been made which prove this conclusively. Certain it is that the decreased barometric pressure upon the external surface compelled a greater expansion of the chest, opening up a larger surface for the interchange of the gases, and consequently a greater oxygenation of the blood, the greatest of all hematinics, with improvement in the digestive system as a result of increased oxygenation.

I believe it is the forced distention of the lungs and bronchi, to those who live at an altitude, that gives immunity against phthisis. Aside from the barrel-shape chest of emphysema, the full round chest is an acknowledged evidence of healthy lungs. A flat contracted chest is a constant invitation to tubercle bacilli and an evidence of so called weak lungs. To imitate the effects of altitude has been my practice for over twenty years, and in the lack of suitable apparatus to assist them, to teach my phthisis cases the art of mechanical expansion. Among the various ingenious methods which have been devised I could find none that were free from objections, as they almost invariably increase the heart's action, which opposes rather than helps the purpose of their use.

I have practiced but two specific exercises, which nature herself teaches. The first is an imitation of the cough, and the second of a person stretching. In practicing the first we take in the air through a space between the lips, about a quarter inch in diameter. Some patients do not grasp the idea readily, or are not accustomed to whistling and require the use of a tube through which to inspire. When the lungs are filled to their utmost capacity the lips are closed and the cheeks bulged to prevent escape from the nose. The air is held until the excess of blood is driven from the lungs, as evidenced by a sensation of fullness in the forehead and slight reddening of the face. By holding the breath after a full expansion, the blood is squeezed out of the lungs into the general circulation, and by frequent practice of it the lost equilibrium is regained.

This action is equivalent to breathing at an altitude, or inhaling compressed air at sea level. The stretching exercise is performed in the same way with the addition of raising the arms, without flexion, directly above the head at the beginning of the inspiration, and lowering them upon the chest as soon as the lips are closed. The purpose of lifting the arms above the head is to lift the chest wall by means of the pectoral muscles. The effect of these exercises is seen in the immediate improvement of percussion note, with lowering of pitch, a rounding out of the depression under the clavicle; the voice changes from a throat to a chest tone, and the removal of the mucous click which has been diagnosed by some pathologists as a sure indication of tubercle. The true respiratory or vesicular murmur, the most significant sign of a normal chest, is restored in its entirety.

A continuation many times a day of these exercises results in a radical cure with no other medicine than that which is directed toward nutrition and the sustaining of the nervous system. All the symptoms heretofore described may return again as the result of neglect. The price of health is vigilance and effort. If the phthisical patient would live and be healthy he must work for it, and in the way I have indicated or by some similar method, or he will miserably perish, notwithstanding he may swallow all the drugs in the dispensatory and be injected with all the serums and specifics, so-called, which are now obtainable. The expansion method of treatment is *nature's method*, and is helpful in every stage of the disease except when there is active hemoptysis from organic changes, at which time they should be stopped until the bleeding ceases, and then begun again with very slight force at first, gradually increasing to the utmost limit after a few days have elapsed.

When pleuritic adhesions have formed, whether bacillary or not, the expansion must be so graded as to avoid fresh exudation, or inflammation, being guided by the sensation of pain. The greatest obstacle to recovery by this method is the ossification of the costal cartilages in a contracted state of the chest; being permanent, it will squeeze the life out. Thus far I have spoken of treatment in the primary stage before organic changes have taken place to any very great extent.

I am often astonished to see what can be done by this method with phthisis cases after they have become tuberculous, with mucopurulent expectoration containing numerous bacilli, with afternoon fever, temperature rising to 101.6 and 102.4, pulse 120, night sweats, anorexia, emaciation and dilated heart. I have seen these cases clear up and remain for years perfectly well, when at the first examination it was impossible to make a diagnosis on account of the foul condition of both lungs, the tubes being filled with râles, the pleuræ sore, respiration only tidal and percussion dull. I defy any one to make an exact diagnosis in some of these cases in detail, as to the extent, kind and location of the diseased processes going on, until he has cleansed the tubes and opened as many of the alveoli as it is possible by expansion.

An easy diagnosis is made by the microscope, but to drop the diagnosis at that and treat the bacilli instead of the patient, is very unscientific, because we have nothing with which we can destroy the bacilli, and even if we could destroy them would it be wise to leave the chest in the same contracted condition, with choked tubes and capillaries, with exudation products in the alveolar walls and their cavities filled with epithelial elements ready for a new infection? More than twenty years ago, before we knew anything about tubercle bacilli, I treated phthisis patients by this method, who had cavities with all the accompanying evidences which we now know as bacillary phthisis. Some of them are living today, well and performing the duties of an active life. Some have married and borne children.

The following case illustrates the effect of expansion upon hemoptysis. This case I saw in his sixteenth hemorrhage. His disease was purely functional, a case of *lazy lungs*. I instructed him as to his breathing, and he has had no return in the last twelve years, being in robust health. As an illustration of the immediate effect of thorough expansion, without medicine which could affect the fever, upon a case which the microscope diagnosed bacillary. The patient had been under treatment about six months before I saw him; male, aged about 40 years; had considerable cough; had lost flesh and strength; some pain in right chest front and back, with diminished expansion.

Oct. 12, 1896, I found him with temperature 101.6, pulse 88; 13, same hour, temperature 100.6, pulse 88; 14, temperature 99.8, pulse 86; 15, temperature 99.4, pulse 88; 16, temperature 99.2, pulse 80; 17, tempera-

ture 98.6, pulse 80. After this the temperature did not rise above 99.4 until an attack of grippe on the 28th, when his temperature rose to 104.4; 29, 104.2; 30, 101.4; 31, 100.8. November 1, normal and so continued, never rising above 99.8 during November. His temperature was taken from three to five times a day. During the first half of December pulse and temperature both remained normal, when my attendance ceased. He continued to attend to his business (which was much in his favor as he was obliged to walk several miles daily) after his recovery from the grippe, and I have not seen him, as a patient, for nearly a year, during which time he has been about as a traveling salesman, enjoying good health. The immediate effect of this treatment is often so astonishing to the friends of patients, that in accordance with the prevailing sentiment among the laity, as to the incurability of consumption, they will refuse to accept the diagnosis, even of the microscope, and after a time become careless and forget the advice to keep the chest well expanded, until the same conditions recur, and the patient returns, again to be told the same thing and to go over the same plan of treatment, or changes his physician for some other kind of treatment. It is easier to take medicines, it is pleasanter to be told they have "only a little bronchitis" and need a little medicine to stop the cough and ease the pleuritic pain.

A quick confidence is gained in the physician who will thus treat them, but it is a deceptive confidence that lulls the patient to a fatal inactivity, and ere long he turns from one to another, until finally he has more need of the undertaker than the physician. These are the saddest cases we see. Their day of grace is passed; organic changes have taken place to such a degree that little can be done but palliate symptoms. There are many cases that progress rapidly toward recovery for a few weeks, and hope is high, when all at once they begin to complain of the labor of expansion on account of weakness of the diaphragm and chest muscles.

This is the point in their disease in which an immediate change to a high altitude becomes (in the absence of suitable apparatus to accomplish the same purpose) an absolute necessity to remove a portion of the incumbent atmospheric pressure upon the chest and abdomen, and thus lighten the labor of breathing, increasing the nutrition of all the tissues through a better oxygenation of the blood. This is the way by which the resisting power spoken of by others is, in great part, sustained, and may be aided by the administration of hematics; the hypophosphites according to the Churchill method, bathing, suitable food, out door life, still remaining under the watchful care of the physician. To those who can not avail themselves of this altitude treatment, this assertion that they are too tired to expand their lungs, is the beginning of the last stage, where there is no reasonable hope for recovery.

To this class of cases, however, the principles of "pneumatic differentiation" may be applied as an equivalent for altitude, and like effects produced in the patient's home at the sea level, as upon the mountains.

The pneumatic cabinet was designed for this purpose twelve years ago, and its action has been proved to be theoretically and practically correct, and is still held by some of the most distinguished men in our country, as second only to altitude, and as "the best therapeutic device ever invented" for the home treatment of pulmonary phthisis.

An insurmountable obstacle to its adoption into general practice has been its great cost. Being a heavy steel cabinet, it can not be moved from place to place to suit the necessities of the patient, but being kept at the physician's office, it may be used for twenty to thirty minutes once or twice a day. Those days on which he needs it the most he is prevented from using it by the conditions of the weather. What we need is a portable apparatus of small cost which the patient can use at his own home under the direction of his physician, using it as often and as long as his case requires. Beneficial as these treatments by the cabinet have proved to be, in many cases bringing about absolute recovery from bacillary phthisis, its success is but a finger board, pointing to something better, yet to be produced, which shall enable the physician to give to his phthisical patients the equivalent of altitude, with the comforts of home and friends superadded thereto, coupled with his careful guidance, in everything that pertains to sustaining the vital forces, improving the quality of the blood by food, exercise, bathing, hygienic clothing and medicine.

Von Ziemssen, at the twelfth international congress at Moscow, last August, says: "Looking back over the history of tuberculosis we see a motley conglomeration of methods of treatment. All these have been discarded, and but two agents remain to be considered, tuberculin and climate.

"Koch's old tuberculin has been forgotten, the value of the new has not been proven, and most people doubt its efficacy.

"The complexity of the lesions makes a cure by means of a specific seemingly impossible. Fresh air has always been one of the requirements, but it is only of late that the advantages of high altitudes has been clearly demonstrated. Fresh air is not all; it is the altitude that brings about an excitation of the blood-making organs, and increases the corpuscular elements in the blood."

Senator "regards altitude second only in importance to fresh air."

Von Leyden says, "So far the only treatment that has given any positive success is the climatic."

The causative relationship of the bacilli to the disease is an important question. Tuberculosis is always produced by the bacilli, but all phthisis is not tubercular in all its stages. I hold that it is an incident in the course of the disease and not the primary cause of pulmonary phthisis. The tubercle bacilli may be found in the air passages of perfectly healthy individuals. It is not commonly found until after considerable organic change has taken place in the pulmonary structure. It can not then be rightly considered as the cause of phthisis."

Jaccoud enumerates a long list of pathogenic conditions and says, "These multiple and variable elements are the true causes of the disease, the microbe is only the instrumental agent."

Barton says, "Back of the bacillus are causes which are operating to produce malnutrition and a lowered vitality."

The evidence of an imperfect lung function as a causative agent is forcibly shown in the effect of the contraction of extensive scars upon the chest resulting from burns and scalds, thus favoring lodgement for the bacilli. Three cases of this sort were reported

last year by Dr. Hall of Denver, in which one side of the chest in each case was scalded during infancy, and pulmonary disease began on the contracted side.

The night sweats of phthisis need to be considered in this connection, because they are a direct result of insufficient pulmonary aeration and exhalation. The skin with its glands is complementary to the lungs and supplements their action by elimination of its exhalation, in double the quantity exhaled through the lungs, being a daily average of 30 ounces for the skin and 15 ounces for the lungs.

When for any reason the function of the lungs is impaired, so that the normal quantity of carbon dioxid is not exhaled, the skin supplements their action at a time when the auto-intoxication has become so great as to cause a temporary paralysis of the vasomotors, with relaxation of the superficial capillaries. The night sweats are always accompanied with increasing weakness of the entire system, and are generally considered the cause of the great prostration which follows them. I do not believe this. The sweat is the result of a specific poisoning, principally by carbonic oxid and the products of metabolism, and is a conservative process, while the exhaustion which follows is a result, not of the sweating, but of the poisoning. We have seen how quickly the skin responds to the demand put upon it in case of urgent dyspnea from any cause. If all this be true, it certainly is very unscientific to give medicines to check the night sweat, for by so doing the system is still further poisoned, the vitality reduced and the end hastened. I have not for many years used medicines to control this symptom, but have found that an increase of expansion systematically carried out uniformly relieves it.

An instance of this kind was recently seen in a case of phthisis in our own hospital. The action of expansion in relieving and stopping night sweats is the strongest argument I could ask for in substantiating the truth of my statement, that it is the poisoning that exhausts and not the sweating and we conclude that it is wiser to treat the cause than the effect.

For several years past almost the entire medical profession seems to have been captivated by the discovery of the tubercle bacillus, and have experimented with many methods and drugs with the hope of destroying them by medication. All these have failed. As well try to check the resistless current of a mighty river by catching the fish in its stream. There is probably not a single case of advanced phthisis in the country today under the care of a physician but what has been treated with creosote or guaiacol or their carbonates. Creosote and its allies, without affecting the vitality of the bacilli seems to have a beneficial effect, temporarily at least, upon the general conditions. This I believe to be done by its antiseptic power over germ life in the alimentary canal. The discovery of the bacillus, although an important addition to our knowledge of one of the stages of the disease, has resulted in no therapeutic advantage, but has rather diverted the attention of the profession from the clinical aspect and the various lessons to be learned therefrom, to that which is only one of the factors in the disease, one which without doubt may be in some cases primary, but which clinical experience proves to be only a resultant, and not the prime causative factor, in the great mass of pulmonary phthisis.

I believe there remains but one method worthy of the undivided attention of the profession, viz.: Aerotherapy as indicated previously, and although it demands of the physician a greater outlay of time and effort for the benefit of his patient, yet I doubt not that ere long the principles of this science will be understood and practiced by the great majority of our hard working fraternity, because the results which follow are distinct and positive, and because there is nothing else which satisfies the requirements in every case, to such a degree as aerotherapy, the science which is destined to take the highest place in all that pertains to the prevention and cure of pulmonary phthisis.

FIVE YEARS' SUCCESSFUL EXPERIENCE WITH A SPECIAL MODE OF TREATING PULMONARY TUBERCULOSIS.

BY CHARLES WILSON INGRAHAM, M.D.
BINGHAMTON, N. Y.

During the past five years I have given my exclusive attention to the special treatment of pulmonary tuberculosis, and during the latter half of this period I have developed a definite mode of treating this disease which has proved so successful that I shall endeavor to place the system before my readers in an accurate and thorough manner, believing as I do, that if this mode of treating these affections was generally and faithfully practiced, the mortality from tuberculosis could be sensibly reduced in a very short time.

The first thing is to make a careful examination, both physical and microscopic, to determine accurately that the disease is tuberculosis, and this examination should embrace a complete family history of the patient. The securing of an accurate and complete family history of consumptive invalids is too often neglected, and this neglect takes from the physician a powerful aid in treating his patient. It is important to know what diseases have existed in the family, and particularly if the patient has inherited a tendency to tuberculosis. Indeed, without the aid of a thorough family history it is impossible for the attending physician to advance an accurate prognosis. It does not matter how mildly the affection has attacked the individual, the prognosis advanced without first understanding the family history is worse than valueless. It is confusing. It may be the means of allowing the patient to follow a line of treatment far from correct, and totally incapable of successfully combatting the disease. With a careful record of the physical condition, and the records of several successive microscopic examinations of expectorated matter, together with a thorough family history, the physician is prepared to commence treatment.

As concerns exercise, how much shall the patient be allowed to take each day? I determine this question with the aid of the fever thermometer alone, and my rule is this: If the daily average exceeds 100.5 degrees, I recommend that the patient take very little, or better still, no exercise; while if the temperature reaches or exceeds 101 degrees, I recommend the thorough application of the "rest treatment," until the temperature has fallen below a daily average of 100 degrees. The temperature must be below 100 degrees for the reason that once having ranged high, it must reach a low average, else it will quickly return to its former height when the rest treatment is discontinued and the usual exercise again begun.

The rest treatment is one important item, and but

for it many desperate cases which have made permanent recovery must have terminated fatally. This treatment is generally known and requires only a very brief reference. This treatment consists in the patient remaining in bed for several weeks, the time varying according to the condition of the patient, as closely as if suffering from serious acute disease, and the physician should forbid the patient from spending a part of the time lying on the couch or in an easy chair. To secure positive benefit the rules of remaining in bed continuously, arising only to have the bed aired, must be strictly adhered to. It is almost marvelous how rapidly a change for the better will occur with the adoption of the rest treatment, and generally so apparent is the improvement to the patient that he is willing to fulfill his part. There are many patients of this class whose recovery may hinge entirely upon the rest treatment, who will refuse to isolate themselves for a few weeks hoping that recovery will be effected without the necessity of following such stringent rules. Others believe they can not leave their business. Necessity compels others to follow some regular occupation.

I refuse outdoor exercise altogether if the height of the fever warrants, although I insist that the invalid remains out of doors all day in pleasant weather, advising him to sit quietly in some sheltered place. I never allow extensive general exercise when the slightest fatigue elevates the fever to a high point. In general also never allow the patient to become fatigued and never allow him to take his meals when fatigued, or after exercise. Always advise a half-hour rest before meals.

Chest expansion should be practiced; encourage the patient to practice expansion of the chest each day, that he may make a perceptable improvement from week to week. I have seen patients with a chest expansion of but two inches increase to six inches within two months. The permanency of recovery from pulmonary consumption depends much upon the chest capacity of the individual, and there is nothing which ensures disease resistance and vital power of the pulmonary organs better than a good chest capacity, while on the contrary experience shows that it is among those who have but little capacity that we find the consumptive invalids.

One of my favorite modes of encouraging chest exercise is to fill a ten-gallon bag with oxygen gas, which is the average daily amount I use in consumptive cases in whom it is indicated, and encourage them to reduce as rapidly as possible the number of inhalations required to empty the sack. Those who do not use the oxygen may be treated by filling the sack with pure air by the aid of an air pump. I have seen invalids who at first required sixty inhalations to empty the sack reduce the number of inhalations to twenty within six weeks, and cases showing this improvement have been by no means rare.

Having now disposed of the subjects of general exercise, rest treatment and chest exercise, I come to the subject of general therapeutics. The administration of drugs by the stomach in the treatment of pulmonary tuberculosis is attended with great uncertainty. No matter how plainly the drug may be indicated, and in a large percentage of cases more harm than good follows the use of drugs in this way. It is well known that the stomach is very weak in all cases of phthisis, from the very incipiency throughout the course of the disease, and in a large percentage of instances the digestive organs are totally unable to perform their ordinary functions of the digestion and assimilation of nourishment, and when there is added to this task the digestion and assimilation of medicines the result is disastrous; the patient receiving no benefit from the drugs, which the proper organs were incapable of assimilating, and at the same time the assimilation of nourishment is more or less interfered with. Hence if the stomach is scarcely able to perform its normal functions we can not expect to introduce into the general system through this medium, any form of medication with any degree of certainty, and in the treatment of tuberculosis where errors are very serious if not fatal, we must make use of means attended with the greatest certainty, and those means which are at all uncertain must not be adopted. It is better not to attempt any mode of treatment which will not, with a reasonable degree of certainty, accomplish benefit for the invalid. The first object to accomplish in the treatment of phthisis is to gain control of the tubercular processes in the pulmonary organs, and until this is accomplished the disease is not under control, or is progressing. We must prevent the extension of the tubercles already formed, check the activity of the bacilli in the tubercular processes, that the lung tissue already involved may be saved from total destruction. And finally we must prevent the multiplication of tubercles, and particularly the extension into lobes which have thus far escaped disease; for every lobe which can be kept free of tubercles, and in condition not only to perform its normal functions but to perform, as far as possible, the functions of the diseased areas, in addition to the work which falls to the lobe normally, is very necessary to recovery. Once in control of the tubercular formations, we are in position to treat the case successfully, but while they are progressive the patient is in grave danger.

The first things to do are the study of the temperature of the case and decide upon the plan to pursue as regards exercise, rest treatment, chest gymnastics, etc. I next decide upon the use of at least two nutritive preparations, and, thanks to our manufacturing chemists, we can find excellent ones made from nauseous, crude substances reduced to a state of palatableness and easy assimilation. I usually administer a petroleum emulsion and a preparation of cod-liver oil. The effects from the use of both are far superior to that from the use of either alone. By administering these preparations, and occasionally using vegetable bitters, acids and the like, to promote the appetite, administering digestive agents as required, to ensure complete digestion, and also ascertaining that the patient makes liberal use of beefsteak, eggs and milk. I am satisfied with the amount of nutrition which is reaching the system.

Aside from the use of occasional remedies to relieve symptoms as they may arise, I administer no remedies by stomach, other than those already named, but depend upon hypodermic medication for the administration of alteratives and altero-reconstructives.

In the early part of 1892 I depended upon the hypodermic use of gold and iodin to accomplish the necessary alterative and reconstructive action, but after a few months of unsatisfactory clinical use, coupled with the fact that both agents, particularly the iodin solution, were exceedingly painful, I discontinued their use, and took up a line of experiment, both clinical and chemical, which finally resulted in the following formula, as shown by actual chemical

analysis. The formula shows the amount of each agent in each fluid dram of the preparation when ready for administration, the chemical compound being dissolved in sterilized oil.

℞ Iodin	gr. ½
Bromin	gr. 1/14
Phosphorus	gr. 1/100
Thymol	gr. ⅔
Menthol	gr. ⅔

The ingredients of the above formula are not prepared in common mixture, but are chemically compounded, with the result that the solution contains no free iodin or bromin, otherwise the pain following its use would be almost unbearable. The chemical solution is of a very bright cherry color, is distinctly transparent, and its hypodermic injection is attended with even less pain than attends the hypodermic injection of a solution of morphia. A common mixture of the ingredients of the formula produces a solution which is of a dark muddy color, is not transparent, and contains both free iodin and bromin. The above formula I perfected only after three years work, and though I was able to use the compound in the latter part of 1892, it was far from being an ideal chemical compound, and its use was both painful and very irritating locally. By careful study and continued experiment, I have succeeded in eliminating, one after another, the disagreeable and imperfect features of the solution, until during the past two years I have made but one change in the formula and that the addition of menthol. In 1895 I contributed an article to the *American Medico-Surgical Bulletin* descriptive of the use of this compound which was my first on the subject, and in this article gave my results from the treatment of fifty cases of pulmonary tuberculosis, which in brief showed nearly 90 per cent. of cures in twenty-one cases treated in the first stage of the disease, nearly 50 per cent. in fourteen cases treated in the second stage, while in the treatment of fifteen cases in the third stage none were cured, though several showed permanent improvement and are alive today. My success since the publication of the article mentioned has been in every respect equal, if not superior to the results here reported, and to this improvement I attribute the action of the menthol, which I thereafter added to the compound. There is one important feature of the action of the menthol in this compound, it is given off chiefly through the respiratory organs, and soon after taking the injection many can detect the odor of peppermint in the breath, which odor is more or less noticeable throughout the day. It has been shown recently that peppermint locally, by inhalation, is a valuable agent in the treatment of tuberculosis, and by this means the lungs are constantly bathed in atmosphere of menthol, with very decided benefit to the invalid.

By the use of this compound I have found it unnecessary to use any other medication, aside from that previously mentioned, and by relieving the stomach of the necessity of assimilating drugs, which can be hypodermically administered, an important point in favor of recovery is gained, and then also, by hypodermic medication, we are positive that a definite amount of remedial agents reach the system each day. The maximum daily dose of this compound, which on account of the contained chemicals I have named "bromin-iodin compound," is one dram. The fact that the patients report daily, with great regularity, for their treatments, and regularity is a factor notoriously abused by this class of invalids in taking medicines per stomach, has much to do with my successful results.

I use a special one dram hypodermic syringe fitted with oil-caliber needles, and usually give the injections in the back of the shoulder. So little local irritation occurs as a result of the injections, that many treatments may be given in a very small area, and I have yet to find the first invalid who can not stand the mode of treatment. The permanency of the recoveries which have occurred under this treatment is another special feature of the remedy. It seems to alter the general system to such an extent, and in such manner that the tissues and fluids of the body are fortified against re-infection. If proper care is taken of the syringe and needles, there is absolutely no danger of inflammation, induration or abscess as a result of the injections, with a properly prepared compound. The compound has proved of especial value in cases of tuberculosis with hemorrhages, and in a number of cases treated no hemorrhages occurred after the first week of treatment. I have every reason to believe that the proper use of bromin-iodin compound (and there is no reason why the general practitioner can not use the compound as successfully as a specialist), coupled with the system of general management and nutritive medication herewith outlined, will, if generally used, effect a decisive decrease in the fatality which attends the ordinary treatment of this disease.

80 Chestnut Street.

A REPORT OF THE TREATMENT OF PULMONARY TUBERCULOSIS BY THE INHALATION OF ANTISEPTIC VAPORS.

Read at the Meeting of the Mississippi Valley Medical Association in Louisville, Ky., October 8, 1897.

BY GEORGE W. JOHNSON, B.S., M.D.

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CHICAGO, ILL.

The antiseptic value of drugs in the treatment of phthisis is well recognized by the profession. But how to administer them in sufficient strength and quantity to control the tubercular and septic processes has been the problem. If administered by the stomach in sufficient strength and quantity to properly saturate the lungs, the stomach and lower alimentary tract is so irritated that the digestive function is greatly deranged. Hence nature's method of controlling the disease by vital resistance is much impaired.

If introduced directly into the lungs by parenchymatous injection, so much irritation is produced that an exudate is thrown out which occludes the finer air passages preventing the introduction of the medicaments.

For two years I have had the medical direction of the Cook County, Illinois, institution. During this period I have treated a great many cases of pulmonary tuberculosis and have always given the patients the benefit of the latest researches of the profession. Each new hope has been inspired only to be soon blighted by some untoward effect. The class of tuber-

cular patients sent to the institution are far advanced in the disease and practically considered beyond human aid. They are simply abandoned by their friends and the physician to die. The inmates of the Cook County Infirmary number from 1,500 to 2,000, and of the Hospital for the Insane 1,400. Since about Feb. 1, 1897, all the tubercular patients have been isolated as much as possible. Since June 1, 1897, 260 patients have been persistently treated by the inhalation of antiseptic vapor, while general and constitutional treatment was followed. The diet for this class is a little better than for the other hospital ward patients. The vapor used consists of eucalyptol, oil of cloves, beechwood, creosote each 10 parts and liquid alboline 100 parts.

These medicaments are vaporized by compressed air of from fifteen to twenty-five pounds hydraulic pressure to the square inch. The vapor is respired from a mask fitting tightly over the nose and mouth and for a period of fifteen minutes each morning. While taking the vapor the patient is required to breathe as deeply as possible and as near the normal number of times per minute as he can. The vapor is not at all irritating and can be easily taken by the feeblest patients. From the 260 patients taking this treatment a clinical record of 40 cases has been kept, with reference to quantity and character of sputa and microscopic examination, temperature, pulse and respiration, cough, night sweats, physical examination and body weight. These cases were selected without any special reference to their condition. A study of the clinical record of these forty cases up to this time shows fairly good results. In every case the sputum is lessened in amount and a weekly examination shows a dimunition in the number of the tubercle bacilli, great benefit is given in the relief of the dyspnea and is the first relief spoken of by the patient.

The respirations become deeper and longer, the temperature less high in the afternoon, in cases where a considerable number of treatments have been taken, the cough and night sweats are much relieved and sleep is undisturbed. Physical examination shows the lungs to be clearing up, the râles disappearing and the respiration approaching nearer to normal and in many cases, an increase in body weight.

An example of which is given in the following four cases:

Case 1.—F. S. Age 41 years. Laborer. Family history negative. Personal history: has been addicted to strong drink. Was admitted December 1896; was coughing almost constantly. Night sweats were profuse. Sputa in great abundance and teeming with tuberculi and pyogenic bacteria. He was much emaciated and very anemic. Had had several hemorrhages and the respirations were short and jerky. He was sent to the tubercular ward and treatment began, which at that time consisted of the administration of beechwood creosote and guaiacol by the stomach—pushed to as much as the patient could stand. He was given a tonic of iron, quinin and strychnin three times daily. A cough mixture of carbonate of ammonia was used. Patient was confined to his bed. The diet was as stimulating as could be provided. Gastro-enteritis developed and all medication was discontinued, except the cough mixture and the tonic. He continued to fail. When the compressed air apparatus was first put in the hospital it was thought best not to give him the vapor, on account of his feeble condition. On June 4 a thorough physical examination was made and the sputa examined for tubercle bacilli, which were found in abundance. His weight was 129 pounds.

Physical examination.—The following physical examination was made September 29 and corresponds with the former save in degree. Inspection: Color normal. No pigmentation. Emaciation but not so extreme. Retraction of left side of chest with impaired motion. Supra- and infra-clavicular retraction. Palpation: No friction fremitus. Vocal fremitus not marked on either side, slightly less on left side. Percussion: Supra clavicular dulness bilaterally; slightly tympanitic note over anterior surface of chest on left side, due to lung retraction. General dulness over posterior aspect of chest. Axillary region, normal resonance. Auscultation: Respiratory murmur universally feeble, especially as heard over posterior aspect of chest. Expiration high pitched. Subcrepitant râles heard everywhere over anterior surface of chest. Vocal resonance increased bilaterally, more especially on left side. Pectoriloquy marked on left side over lower portion of lung. As ominous as this last finding may seem, this man has gradually improved and he now coughs very little, the night sweats are entirely absent, the respiration though still impaired is much improved. He has no hemorrhage. The quantity of sputa is small and the tubercle bacilli very few. In fact seven slides were examined before any were found. He feels much improved and has not spent a day in bed for two months. The P.M. temperature is two degrees less. He has taken 79 vapor treatments and weighs 133, a gain of but 4 pounds.

Case 2.—A. M. 56 years of age, Scotch blond, R. R. fireman. Family history good. Personal history: had syphilis twenty years ago. Has been coughing for two years. Was admitted May 18, 1897. At that time was so feeble that he was taken to the ward on a stretcher. Cough and dyspnea were so troublesome that he had to be bolstered up in bed nearly all the time. Had had hemorrhages and night sweats. Sputa were abundant and muco-purulent, and tubercle bacilli were found in great numbers. Weight 102 pounds.

Physical examination.—Inspection: Expansion very limited. Pigment over chest. Palpation: Vocal fremitus everywhere slight. Percussion: Dulness everywhere in greater or less degree except in axillary region. Slightly tympanitic in these regions. Dulness more marked in supra-clavicular regions anteriorly and posteriorly and over right middle lobe. Auscultation: Respiratory sounds very feeble almost completely absent over right middle lobe, vocal resonance being marked here, as well as lower posterior aspect of chest. Pleuritic friction well marked over apices, bilateral also on forced inspiration over lower extremities of lungs. Marked inspiratory dyspnea. This man has improved in all these conditions. His respirations are free. Has had no hemorrhage. Expectorates only in the morning on rising and then but very little. Four slides were examined on September 29, and bacilli were found. He has taken seventy-eight vapor treatments and has gained twenty-one pounds since the first of June.

Case 3.—C. W. 44 years, German. Family history: Father died of pneumonia. Personal history good. Has been ailing for three years but has had no hemorrhage or night sweats. Cough was bad on admission in January 1897. At that time patient was feeble and anemic and expectorated great quantities of purulent matter, which was teeming with tubercle and pyogenic bacteria. Afternoon temperature ranged from 103 to 104 degrees. He weighed 105 pounds.

Physical examination.—Inspection: Color anemic. No pigmentation. Expansion limited, almost entirely absent on left side. Left side markedly smaller than right. Left shoulder drooping. Palpation: No friction fremitus. Vocal fremitus absent over anterior surface of chest on left side, also over left upper posterior aspect; normal over right side of chest. Percussion: Left supra-clavicular region flat, infra-clavicular region dull; gradually less dull down to third rib; right supra-clavicular region dull, below this resonant to sixth inter-space. Posteriorly: dulness over supra-scapular region on both sides; dullness marked over entire left aspect; normal resonant tone in left axillary region. Auscultation: Tubular breathing over the left infra-clavicular regions with faint moist râles. Suppressed high pitched respirations over remainder of left side and posterior aspect of chest. Normal vesicular murmur over right posterior aspect. Vocal resonance increased over entire lung surface. This man's physical condition has improved wonderfully. His temperature never goes above 99 degrees. coughs but little and expectorates scarcely any. Has had no hemorrhages and sputum is almost entirely free from bacteria. He has taken eighty vapor treatments and gained ten pounds.

Case 4.—S. D. Age 40. English, clerk. Family history: Two brothers and two sisters died of tuberculosis. Personal history: Single, habits good. Was compelled to stop work and was admitted June 8, 1897. Was anemic and emaciated. cough very troublesome; nocturnal perspiration exhausting. Was failing rapidly. Sputa contained abundant tubercle bacilli. He began to take inhalations of the antiseptic vapor at once and has persistently continued. Weight 130 pounds.

He is gaining steadily. Sputa and cough almost entirely absent. Dyspnea somewhat relieved. In all the following physical conditions he has improved.

Physical examination.—Has tuberculosis of the larynx. Color normal. Retraction of soft parts on inspiration more

marked in supra-clavicular regions. Left side smaller than right side. Percussion: Supra-clavicular flatness bilateral. Dulness everywhere except small area in axillary region on both sides, where a tone of hyper-resonance is obtained. Dulness more marked on left than on right side. Cardiac dulness extends about one inch to left of mammillary line reaching only to left border of sternum. Auscultation: Subcrepitant râles over apices, bilateral. Mucous râles over left lower lobe. Bronchophony marked over apices, increased elsewhere. Broncho-vesicular respiration over upper lobes bilaterally. Examination of a scanty amount of sputa on September 29 showed but few tubercle bacilli. He has taken 100 vapor treatments and gained 10 pounds since June 8.

While there has been marked improvement in the symptoms in every case, some have improved very much more than others. These were a most unfavorable class of patients to treat, being in the advanced stage of the tubercular process with hemorrhages, emaciation, night sweats, anemia and, in fact, scarcely able to breathe at all. In the absence of a specific for tuberculosis, we believe that with proper apparatus and skilful and continued administration much is to be hoped for in this class of patients by the inhalation of antiseptic vapor.

The respiratory movements so limited in tubercular patients are increased; the catarrhal condition of the upper air passages and especially in laryngeal tuberculosis is removed, thereby aiding better introduction of air into the lungs. The pulmonary air-passages are rendered and kept in a more aseptic condition thus minimizing the danger of new invasion. The alimentary tract is undisturbed by strong and irritating drugs, giving ample opportunity for the increase of vital resistance, by suitable diet and constitutional treatment.

The treatment of this class of patients by the inhalation of antiseptic vapor is both rational and practicable. For when the vapor is properly prepared and administered it is so fine and non-irritating and so intimately mixed with air that it must find its way to every portion of the lung substance that air in any form reaches.

I am fully convinced, from my short experience, that if the proper apparatus is used and the vapor not too strong, and given for from fifteen to twenty minutes twice daily, together with bitter tonics and supportive diet, great relief if not ultimate recovery may be brought to this unfortunate class of sufferers. It has been proved that when the vapor is properly prepared and administered that it reaches the minutest ramifications of the pulmonary air passages in the healthy lung. This fact being established it is no longer the question; how can medicaments be made to reach the alveoli? But rather, how soon will the therapeutists provide us with a specific for the tubercle bacilli? This done the dread malady of tuberculosis will no longer be credited with one-fourth of our mortality. That so large a number of cases have been relieved of their most distressing symptoms together with physical improvement, inspires a new hope and ambition for more thorough and extensive investigation. Any method of treatment that brings relief to the class of patients that I have treated gives bright promise for those in the incipient stage of the disease.

Orthoform in Tuberculous Laryngitis.—Neumayer announces that orthoform will relieve the pain which renders swallowing difficult in tuberculous laryngitis, buccal ulcerations, cancer of the tongue, etc. The substance can be insufflated or the surface painted with a 10 per cent. solution of the hydrochlorate, renewing the application as often as necessary, orthoform being non-toxic. (*Vide* JOURNAL, Vol. 29, pages 700 and 1170.)

PULMONARY TUBERCULOSIS WITH SPECIAL REFERENCE TO DIET.

Presented to the Section on Physiology and Dietetics at the Forty-eighth Annual Meeting of the American Medical Association, at Philadelphia, Pa., June 1-4, 1897.

BY HUBBARD WINSLOW MITCHELL, M.D.

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The purpose of this paper is to set forth some practical observations acquired by direct clinical experience upon the treatment of pulmonary tuberculosis with special reference to the effect exerted upon it by a due application of certain dietary regulations.

THE NATURE OF PULMONARY TUBERCULOSIS.

Pulmonary tuberculosis is a true inflammatory process set up by a specific morbific influence in the delicate lung tissue and terminating in true ulceration and suppuration of the lung substance. I will briefly recall the anatomy of the lung. The trachea divides into the right and left bronchi. These divide again into secondary and tertiary bronchi, and the subdivision continuing, the bronchial tubes grow more attenuated and more numerous as they subdivide. They also grow more delicate in structure, and when finally they reach a minute size, they are comprised only of a thin membrane lined with pavement epithelium resting upon an elastic fibrous layer. They are then known as the ultimate bronchial tubes. Each one of these terminate in a lozenge shape islet of delicate pulmonary tissue called a pulmonary lobule. Each lobule consists of a vascular membrane in the form of a sac, from the cavity of which are numerous secondary compartments divided by thin partitions projecting from its inner surface. These minute cavities are pulmonary vesicles. Their walls are distensible and elastic, and expand and contract during the respiratory act.

These minute pulmonary vesicles are surrounded by capillary blood vessels which penetrate their partition walls. The abundant elastic tissue in the walls of these pulmonary vesicles gives to the lung its property of resiliency. These pulmonary vesicles are also called air cells or alveoli, and are largest at the apex of the lung and smallest in the interior. The aggregated mass of the pulmonary vesicles form the spongy or parenchymatous tissue of the lung.

The lung tissue is nourished by the bronchial arteries, which ramify upon the walls of the smallest pulmonary vesicles. The blood is returned through the bronchial veins. The pulmonary vesicles are supplied with lymphatics and nerves, the latter being supplied chiefly by branches from the sympathetic and pneumogastric.

The nature of pulmonary tuberculosis is an inflammatory process called into activity in these delicate structures by the introduction of a special microbe, the tubercle bacillus, which can flourish and multiply only when brought in actual contact with these sensitive and extremely attenuated membranes.

ITS CAUSE.

When this microbe has succeeded in gaining a lodgment upon the delicate pavement epithelium of a pulmonary vesicle, its specific action at once springs into activity, and this is first a congestion of the capillary vessels of the part, which is speedily followed by a true inflammation.

Succeeding this is the formation of minute masses which are called tubercle. These tubercle masses are formed in great numbers upon the delicate walls of the vesicles, and in a short time undergo a process called caseation or softening. At the same time they break down the vesicle walls, so that several pulmonary vesicles are thus turned into one.

As this softening process goes on and the matter accumulates in quantity, it is forced into the smaller bronchi, thence passes during the respiratory act into the larger bronchi, and is finally coughed up and expectorated by the patient. The expectorated matters are yellowish or greenish in color, and under a suitable power of the microscope are seen to contain great numbers of pus-cells with bacilli more or less numerous, as well as broken down lung tissue.

It is doubtful if pulmonary tuberculosis is caused in any other way except that mentioned. Heredity plays a very unimportant, if any part at all. Not all persons who inhale bacilli contract this disease. It is only those in whom a special adaptability to harbor the microbe become its victim.

The microbe has a veritable struggle for life. Its journey from the outer world through the air passages to the delicate structure of the vesicle is not without danger to itself, and hence few of them only find a successful lodgment in the pulmonary vesicles, which they must do before they can begin their baleful work. Most of them are arrested and die before they can reach a point favorable for their development. Only the most vigorous life and the fittest are the survivors.

ITS CONTAGIOUS PRINCIPLE.

Pulmonary tuberculosis is contagious when the bacillus is introduced from some source where it has retained its activity and virulence, and when we remember that the sputum from phthisis patients contains great numbers of these bacilli, which are distributed widely through dust and the carelessness with which sputum is voided, it will be seen that the danger from contagion is great, and it is in this way that the bacillus enters the lung by inhalation and the disease is acquired, but contagion by contact with a phthisis patient, and by inhaling his breath is very slight indeed.

ITS SYMPTOMS.

When the bacillus has invaded the lung tissue the symptoms are quickly manifested. The patient develops a cough which seems first to be of a bronchial type and is marked with expectoration of a mucopurulent character. The early physical signs are those of bronchitis, but very soon dyspnea occurs and becomes more or less severe. Respiration rises from twenty to fifty per minute, and the general distress is usually well marked.

ITS HABITAT.

The tubercle bacillus can not exert its specific poisonous action unless it finds a congenial habitat, and this is what may be called an alkaline temperament, and this temperament plays a very important part in the acquirement and behavior of phthisis. Persons who are thin, tall and anemic, and those having red or sandy hair, or light blonde hair with a thin pallid skin, pale mucous membranes and weak sexual organs, are those who are very liable to tuberculosis, very much more so, in fact, than do the darker hued or more athletic persons, or those who have the acid temperament. In these alkaline subjects the disease seems to make rapid progress, and it is in the apices of the lungs, where the pulmonary vesicles are of large size, that the disease seems to locate by preference. In the apex of one or both lungs cavities form more readily, and the disease seems more virulent than when in the middle or lower lobes, and it is these patients who are tall and pale and badly nourished, and whose blood is deficient in red globules who acquire phthisis very readily. The apices are almost always involved, and he resists treatment to a great degree. In these cases also, when the disease has made any progress, the poisonous principle of the disease, whatever it may be (ptomains, or absorbed poison from the tubercle), seems to pervade the entire body, and he has therefore diarrhea, night-sweats, hemorrhages, anorexia, thirst and mal-assimilation of the little food he takes. These patients offer a congenial habitat to the bacilli and fall before their ravages like the morning dew. They are so difficult to treat and so persistent that they seem almost malignant.

When such a weak lung or special temperament, or readiness to receive the disease is found, it becomes a ready prey to the immigrating microbe. In many cases where bacilli are introduced into the lung they are destroyed for some reason, and this reason is either an acid temperament, or an individual power to resist disease, or a failure to gain a favorable lodgment upon the thin and sensitive walls of the air cells.

ITS ECONOMIC VALUE.

It has been held that disease, and particularly tuberculosis, has a certain economic value in checking the over-population of the earth. In former geologic epochs the exuberance and over-production of animal life has been restrained and held in check by the operation of several influences. The lower orders of animal life that have been so prolific in development have been preyed upon by the higher species of animals who used them as food. Every order of animal life has found a destructive enemy in some other order, and this process of animals preying upon others has served in all geologic ages as a complete check upon the over-production of any one species.

With man, however, the case is different. There is no higher order of animal than himself to hold in check the rate of his increase. To control and repress his too great reproduction, other influences quickly sprang into action. They were three in number. 1, his own exterminating wars; 2, the fearful ravages of disease; 3, his individual vices.

Man's early tribal quarrels were very destructive and continued in activity until replaced by more fatal methods of modern warfare. These repressing influences acted with such mournful force as to seriously affect, on several occasions, the welfare of mankind. We see in the reign of the Roman Emperor Justinian, A. D. 527–565, that the influence of his wars, to which must be added the famine and disease that followed, destroyed more than one hundred million of human lives and depopulated some of the fairest provinces of the earth. This destruction caused a visible diminution of the human race.

The ravages of disease have also acted as a potent check upon the increase of mankind. As he aggregated into communities and nations and lived in close contiguity with his fellows, he knew nothing of sanitary laws and hence suffered severely from sporadic and epidemic diseases. Plague and famine so baleful

in their effects were also the result of his ignorance. Tuberculosis played a malignant and destructive part, and it has been stated, destroyed one-third of all those who died of disease. Whether this special disease has any economic value or not we can hardly say, but the question is not without force when we observe closely the character and temperament of its many victims.

The individual vices of man truly have an economic value. Habitual criminals, the cruel and morbidly vicious, the drunkard with his insatiable desire for intoxicants, and the prostitute are all victims of disease, nervous and otherwise, and all lack the mental balance necessary to make them sound and responsible beings. It is from the ranks of these classes that the insane are so largely recruited, and fill our asylums with their mournful presence. When either of these classes are allowed unrestrained action to their vicious or intemperate habits, their career is brought sooner or later to an end, and the prison, the hospital or the grave removes them from the walks of the living world.

ITS OCCURRENCE IN THE LOWER ANIMALS.

In the animal kingdom certain species contract pulmonary tuberculosis more or less readily. The species that acquire this disease are those brought in contact with man, either in the feral or the domestic state. Among the feral group come first the great order of apes, which may be divided into two general classes, as follows: The cynomorpha or dog apes, and the anthropomorpha or man-like apes.

These apes have been called the catarrhine apes, that is, having a nose with narrow nostrils and a thin septum

Some years ago while visiting West Africa I spent some time on the Congo River and saw considerable numbers of baboons. They are very alert and mischieveous, live in groups of twenty or more, and are fond of the dwellings of man, where their thievish ways cause them to be regarded by the natives as a great nuisance.

On several occasions while we were hunting, a group of baboons would be seen hovering over one of their number who appeared to be unable to move. It was easy to approach, as he was too feeble to escape. Inquiring of the natives I found that the baboons were frequently taken ill with some chest trouble which was similar to that from which the natives themselves suffered. This I learned afterward was phthisis, which is not uncommon among the blacks in the lower Congo districts.

The mandril (*cynocephalus mormon*) and the magot (*macacus sylvanus*) are also frequently met with on both banks of the Congo.

In the wild and almost uninhabited country about 150 miles north of Cape Town in South Africa the common baboon is very numerous, and is a most unwelcome visitor to the negroes, who suffer from their thievish and predatory ways. They have little or no fear of man.

An English officer told me the Hottentots and negroes often contracted phthisis on their periodical visits to Cape Town, and it seemed to me that the baboons contracted the disease from the sputum of these natives, which they carelessly voided in their gardens and about their houses. This gentleman had often seen sick baboons presenting the same symptoms as the natives when suffering from phthisis.

One day while hunting in the adjacent hills I saw a baboon lying upon the ground. On my approach he made no attempt to escape, for he was extremely emaciated and had a severe and violent cough. At that time the existence of the tubercle bacillus was not known, but I felt sure that the baboon was suffering from what we now term pulmonary tuberculosis.

THE DOMESTIC GROUP.

The common ox (*bos taurus*) is so frequently affected with tuberculosis as to require the rigid surveillance of our great abbatoirs by inspectors who are appointed for this special purpose. It is no doubt true that these animals contract the disease from their long and close association with man.

The dog (*canis familiaris*), and the cat (*felis domestica*) are both very liable to tuberculosis, and this would seem an almost self-evident fact from their intimate association with man.

The duck (*anas boscas*), the goose (*anser anser*), and the domestic fowl occasionally contract this disease. It is not improbable that other animals are victims to tuberculosis, but they have no especial interest for us here. We are especially interested in those animals whose flesh and milk we consume as necessary articles of our daily diet.

ITS DIAGNOSIS.

The diagnosis of pulmonary tuberculosis is usually very plain. The presence of cough, expectoration, emaciation, diarrhea, night sweats, loss of appetite, thirst, anorexia with hemorrhages more or less severe, are nearly always present and reveal the true nature of the disease. The unfailing test is, however, the presence of the bacillus in the sputum. Without bacilli the disease is not pulmonary tuberculosis *per se*. A very early diagnosis can thus be made. The competent and careful physician has little difficulty in arriving at a true diagnosis even without the immediate examination of the sputum. He may begin treatment at once, but must examine the sputum for bacilli in order to confirm his judgment. These examinations should be made frequently during treatment, that he may know if the bacilli are diminishing and whether his patient is really recovering.

ITS PROGNOSIS.

Pulmonary tuberculosis when not modified by treatment is an extremely fatal disease. No accurate percentage of deaths can be given, because these differ with many writers, but once the disease is allowed to run its course without treatment, and especially in one of an alkaline temperament and a generally anemic condition, it is a rapid and terribly fatal disease.

TREATMENT.

We are called upon to treat a very complex disease. At the very outset we must not forget that pulmonary tuberculosis is an inflammatory disease of the spongy tissue of the lung, due to a special microbe and followed by a true ulcerative and suppurative process in the delicate lung tissue. It may be described briefly as a special ulceration in the pulmonary vesicles with an expectoration of the suppurating matters, and any treatment which is destined to cure or even relieve it, must be addressed to this ulcerating condition of the lung.

To successfully treat a disease so lethal in character and so complex in nature, it would seem that some remedy which can be introduced into the body at short intervals and for a long period of time, something that will act as an antiseptic by saturating the blood and modifying or destroying the bacillus and at

the same time inflict no injury upon the organs of the patient, would appear to be an ideal remedy.

A considerable percentage of cases of phthisis belong to the alkaline temperament, and a remedy having an acid reaction would appear to be especially indicated. From experience, which has been considerable, I believe that a solution of the halogen group of salts, with the hypochlorite of sodium added in due proportion, is the best remedy to modify and perhaps cure pulmonary tuberculosis.

This remedy acidifies the blood when saturated with it, and almost immediately relieves the extreme cachexia, loss of appetite, weakness and night sweats which form such distressing symptoms. The cough which is nearly always present, sometimes distressing and even terrible, can easily be relieved by giving a mixture of iodid of potassium (10 grains) with a little sulphate of morphin ($\frac{1}{5}$ grain) and a syrup as a vehicle, or a capsule of quinin grs. iij. (.2) and pulvis opii gr. ss. (.03) may be given during the day and at bedtime.

For the hectic fever nothing is better than a capsule containing grams .26 quinin, and grams .0014 sulphate of strychnin once or twice daily.

Alcohol in the form of whisky or brandy is nearly always indicated, especially when the disease has made any progress, and when the vital powers are feeble and the pulse weak and rapid, I usually give 30 c.c. of whisky slightly diluted with plain or mineral water twice or thrice daily for perhaps a month at a time, and then omit it for a while according to the progress of the case. It can be resumed at any time subsequently. Wine and malt liquors should never be given, as they are apt to disagree with the stomach.

DIET.

Proper diet forms an essential part of the treatment of phthisis. When we are dealing with a severe and wasting disease the diet should receive especial attention. The physician must always prescribe such articles as are nutritious and easily assimilated. Meats of all kinds, fish, shell-fish and eggs may always be given. Rich soups of beef, mutton or chicken are especially valuable, and are palatable and nutritious. Puddings of the farinaceous kind with good bread and butter are also nutritious and well borne. Coffee with cream, strong tea, chocolate, milk and milk punch, may be given freely as beverages. Cooked fruits may be given cautiously, but never raw fruits, as they are apt to induce a troublesome diarrhea. High seasoning with salt, pepper, mustard and vinegar and other condiments are well borne and act as stimulants and assimilants to the digestive organs, and usually are agreeable to the patient.

I can not speak too strongly upon the inestimable value of cold water as a beverage in phthisis. We must remember that the blood is deprived of its watery parts to a large extent by the wasting action of the disease, and hence the thirst which is sometimes very great, and the hot and burning skin so often present. I always insist upon the patient drinking large quantities of cold water at any time without limit. He may drink ordinary potable water or use one of the many excellent mineral waters now so easily obtainable. Among those I like best are Vichy, Seltzer, Appollonaris, Poland Spring and the Great Bear Spring. All of these are most excellent waters, and when iced are palatable to the patient.

The daily warm bath is of great value in reducing the surface temperature. It can be taken any time during the twenty-four hours. The temperature of the bath can safely vary from 90 to 100 Fahr., or even higher if agreeable to the patient.

REST AND SLEEP.

Perhaps second in importance only to water, is rest and sleep. Phthisis is a wasting disease and the muscular power of the patient is largely lost through atrophy of muscular tissue, and any effort that is not absolutely needed is harmful. Let no restriction be placed upon his hours of rest and sleep.

In conclusion let it be remembered that a drug of an acid reaction is the one specially required, and that a wisely selected and generous diet, together with liberal potations of cold water, the bath and sleep, when prescribed by the wise physician, form the best means at our command to combat, relieve and cure the dreaded disease known as pulmonary tuberculosis.

747 Madison Ave.

ON THE DIET AND GENERAL CARE OF CONSUMPTIVES COMING TO SOUTHERN CALIFORNIA.

Presented to the Section on Physiology and Dietetics at the Forty-eighth Annual Meeting of the American Medical Association, at Philadelphia, Pa., June 1-4, 1897.

BY GEORGE L. COLE, M.D.

LOS ANGELES, CAL.

When asked to contribute to this Section I recalled the fact that only a few days previously a patient consulted me who had recently been sent to this region by his physician in one of the Middle Eastern States. His doctor had told him to go to Southern California, find a place suitable to live in, receive the benefit of the climate and not waste his money on either physicians or drugs, to use his own judgment and when he thought best to return to the East. Not this case alone, but the many similar cases, impressed me with the fact that a few words along this line may result in benefit to some who may seek such a change in the future.

Imagine the responsibility thus laid upon the patient. How shall he find the place suitable for himself? How should he know where to find suitable lodgings and table? How shall he learn of the proper clothing to wear in a climate wholly different from that he has left? Most of all, how is he to judge competently of the improvement made at the end of three, six or twelve months, in order that he may know whether best to remain longer or return to his home? Because he finds himself transported from snow and ice to a scene in which sunshine and flowers abound, he immediately dons his summer clothing and succeeds in contracting a cold, if nothing worse. He takes his first day's outing in an orange grove and proceeds to demoralize his digestive apparatus by partaking of the golden fruit, unripe and unfit to eat. He returns to his temporary quarters at his hotel, to awaken the next morning in anything but an amiable mood in which to set out in search of a permanent location. His stomach upset, snuffling with a cord, he finds some pleasant rooms situated on the north side of a building. He does not notice the absence of the sun's rays from morning till night, but rather has his attention called to the "beautiful mountain view" by his would-be landlord, who is quietly reserving his sunny rooms for others more experienced in the requirements of the invalid. The patient does not notice that his room has no

device for proper artificial heat, or if he does notice the fact he is promptly informed that one of those abominations in which the country abounds, a kerosene heater, will answer all purposes. In such quarters he takes up his abode and succeeds in prolonging his cold until he has a genuine bronchitis and augmenting his diet with green fruit, serves to continue the disorder of his digestive organs, until, at the end of three or six months, he concludes that his own Eastern climate, with home comforts, is about as good for him as to live here with a constant dyspepsia and bronchitis. And really he has now arrived at the proper conclusion. He begins to wonder if his lungs are in any better condition than when he came to such an abominable climate. He seeks a physician, who has no data of his condition at the time he arrived in California, but who tries to put him right in matters pertaining to location, clothing, diet, suitably heated sunny apartments and other matters pertaining to his general welfare and comfort; possibly suggesting some remedies which may tend to relieve the bronchitis and dyspepsia which he has contracted. The patient stays a month longer and returns to his Eastern home in a worse condition than when he left.

What a different picture thus presented from that of the patient who, on first going to a new section in which there is such a contrast to that of his former home, seeks medical advice and is started out correctly at the beginning of his new experience. A careful physical examination is made and recorded, so that at some later time he may be intelligently informed as to the progress he has made, and some definite reason given why he should remain longer or return to his home. By knowing his history and physical condition the physician can direct him to a suitable location. And some location well suited to nearly every individeal can be found within a radius of one hundred miles from Los Angeles. Any altitude from sea level to 6,000 feet can easily be secured, with comfortable quarters, and the patient may at the same time be guided to sections varying greatly in relative humidity.

Do not misunderstand me as pleading in behalf of our local physicians for remunerative fees. It is not this. But the manifest injustice done by many Eastern medical gentlemen to their clients in this respect when sent from home has caused so much needless suffering among this class that I can not forbear a word of criticism. At the same time I commend the host of Eastern physicians who provide their patients with suitable letters to physicians who, while not infallible, nevertheless do better in guiding the patient than he can do for himself.

TUBERCULOSIS AND VINEGAR.

Presented to the Section on Physiology and Dietetics, at the Forty-eighth Annual Meeting of the American Medical Association held at Philadelphia, Pa., June 1-4, 1897.

BY JOHN ASHBURTON CUTTER, B.Sc., M.D.

NEW YORK CITY.

The enormous amount of work done in bacteriologic lines as to tuberculin has been of such little avail as to treatment and prevention, that I have no hesitation in bringing before the Section in a few words, a record of work that has been done on other lines and to the glory of medicine in that this work has cured the desperately sick and prevented the pre-tubercular becoming tubercular.

Dr. John Christian read a Latin inaugural thesis at Jena, October, 1729, in which reference is made to the coagulation of living blood by vinegar which he says dissolves silica and poisons like viper's venom. He laid down the law, "*Causa coagulationis sanguinis est acidum.*"

In "The Relation of Alimentation and Disease," Dr. James H. Salisbury recounts his investigations made on 1,028 hogs fed with sour foods in 1858. Salisbury in the preface, page iii, says: "I had been a graduate of Albany Medical College, and in 1850 entered upon the practice of medicine. I was immediately and forcibly struck by the almost entire want of medical knowledge in regard to the true causes of disease, and by the consequent uncertainty that must and did exist as to the means of combating and curing pathologic states." Salisbury's first publication relating to foods that ferment into alcohol and vinegar and are thereby causative of consumption of the bowels and lungs was made in 1864 in the Surgeon-General's report of Ohio; this paper and the matter found in "The Relation of Alimentation and Disease" (published 1888) contain enough to show this investigator's work as to the relations of vinegar and tuberculosis; yet I believe that medicine was not wholly the chaos he considered it when he started to practice in 1850; honor to whom honor is due; honor to Salisbury for his colossal experiments in feeding hogs to death with sour foods. (I would that some of the quid nuncs in bacteriology would enlarge their ken and get away from the bacteria and study yeasts, alcoholic and vinegar.) Honor to the Europeans who recognized the souring properties of certain foods before the time of Salisbury's publications.

In the bibliography appended, much of which is from the publications of this ASSOCIATION, I show what has been done by an American writer:

BIOLOGICAL.

"The morphology of the blood in health is as follows:[28]

"*Color.*—Bright, fresh, clear, ruddy, strong. Clottings, rapid and firm.

"*Red corpuscles.*—Arrange themselves in nummulations, or are scattered evenly over the field; normal in size; non-adhesive; central depression well marked on both sides; periphery well rounded, clean-cut. Hold coloring matter firmly. Pass readily to and fro through the fibrin filaments. Appear fresh and fair.

"*White corpuscles.*—Normal in size, not enlarged by internal collections of foreign bodies. Ameboid movements strong or not. Proportion, 1 to 300 of red corpuscles. Consistence good, not sticky. Color a clean white. Freely moving at will.

"*Serum.*—Clear and free at first sight from any form. After fifteen minutes, most delicate semi-transparent fibrin filaments appear, forming a very light network in the field, which offers no obstacle to the passage of the corpuscles."

The morphology of the blood in tuberculosis is as follows:[28]

"*First or incubative stage.*—Red blood corpuscles are less in number, ropy and sticky more or less, but not much changed otherwise.

"*Second stage of transmission*:—1. Red corpuscles: Color pale, non-lustrous; not clear-cut, not ruddy. Consistence, sticky and adhesive. Coating of neurin removed. Not so numerous as in normal blood. Owing to the increased size and strength of the fibrin

and the stickiness, they form in ridges, rows, but not so marked as in rheumatic blood. They accumulate in aggregations of confused masses, like droves of frightened sheep. They adhere to each other, and are rotten, as it were, in texture. 2. White corpuscles: enlarged and distended by the mycoderma aceti, or spores of vinegar yeast, that are transmitted into the blood stream from the intestines. 3. Serum more or less filled with the spores of mycoderma aceti, or vinegar yeast. These occur either singly or in masses of spores, which is the common form in which they are found, wherever vinegar is produced. The fibrin filaments are larger, stronger, more massive, than in health, and form under the microscope a thick network which is larger, stronger and more marked in direct proportion to the severity of the disease or the amount of accumulation. Besides the serum is apt to be of a dirty ash color. The sticky white corpuscles, the massive fibrin filaments in skeins, and the yeast spores alone or combined, form aggregations, masses, collects, thrombi and emboli which block up the blood vessels of the lungs soonest, because exposed to cold air, the most of any viscus; the blood vessels contract and thus arrest the thrombi and form a heterologus deposit, which is called tubercle.

"*The third stage of tubercular deposit.*—These deposits increase so long as vitality subsists in the tubercle and surroundings. When vitality ceases, the tubercle softens or breaks down. Sometimes if the process is very slow and life slightly inheres in it, the proximate tissue undergoes fatty infiltration which preserves it from readily breaking down. The morphology of the blood is the same for the second and third stages of consumption.

"*Fourth stage, interstitial death.*—The red corpuscles are thinner, paler, much lessened in number, increased in adhesiveness, stickiness and poverty; devoid more or less of neurin. The white corpuscles are fewer in number, more enlarged, often ragged and rough. Distended with spores of mycoderma aceti; more adhesive, and sticky. *The serum.*—Fibrin filaments are thickened, stronger; more massive, and more skeins of them present. The collects of mycoderma aceti are very much larger and more numerous; in moribund cases, I have seen them so large as almost to fill the field of the microscope."

PRE-TUBERCULOSIS.[19]

"The idea that diseases have periods of incubation preceding their full development accords with other facts in animal and plant biology. It is to be expected that tuberculosis of the lungs, for example, has a prestage. In fact, pre-tuberculosis exists and clinically means that the morphology of consumptive blood is present to a lesser extent than in tuberculosis, that the essence of pre-tuberculosis is in these vegetations in the blood, which coming from the fermentations in the alimentary canal, pass the barriers of the intestinal epithelia and float about in the blood stream of consumption any time during one year before the necrosis or sphacelation or breaking down of the lungs, sufficient to be detected by the usual signs, furnished by auscultation and percussion. It is evident that in such spongy bodies as the lungs small deposits may escape physical macroscopic exploration. But the microscope will detect this stage."

VINEGAR AND HOG CHOLERA.[19 38]

"Seven years ago, my son and I independently studied hog cholera, on a large stock farm in Western Massachussets, autopsying animals immediately after death; 1, by the disease, and 2, by slaughter in early and late stages of complaint, the proprietor giving us every opportunity of macroscopic and microscopic examinations of blood and tissues of his animals, as he considered his herd doomed. We found, independently: 1, the blood morphology of tubercle and embolism; 2, tuberculosis of lungs, bowels, skin; 3, recent fibrin clots in heart; 4, partial paralysis of hind extremities; 5, paralysis of nerve centers.

"*Causation of this epidemic.*—1. Steady feeding of ensilage which is loaded with vinegar and vinegar yeast; 2, swill food brought from outside; 3, cold weather; 1 and 2, predisposing causes; 3, exciting cause."

The hog physically is much like man; man is very much of a hog as to eating food that makes swill, and hence suffers much from tubercle.

WORLD WIDE RELATIONS.

The Esquimau does not die of tuberculosis. He lives on animal food, yet for months of each year he breathes a vitiated atmosphere.

Tuberculosis ravages in the South where little good beef is eaten and instead very much of vegetable food. Some fifteen years ago a resident of Savannah, Ga., came under treatment in New York. He changed his mode of living and became a beef eater. Since that time all of his family have died of tuberculosis; he lives because of his beef-eating habits. The negro dies of tuberculosis. Causes, poor food, the mental strain of trying to reach the white man's level, and syphilis, with its grandchild scrofula, and tubercle.

Tuberculosis has ravaged in New England, especially the rural portion, with its diet of pie three times a day and baked beans, which latter, chemically, are splendid food for cattle, but for man not fit, unless cooked for many hours. Tuberculosis is now diminishing in New England because they are eating more beef and drinking more milk, although there has been very much of foolish opposition to the use of milk.

Cattle are dying in New England and other places of tuberculosis, and so long as the silo with its alcoholic and vinegary products is used, so long will farmers lose their cattle. A man imported a splendid herd from the Island of Jersey some fourteen years ago. He had a silo. He was expostulated with as to the dangers of feeding sour foods to his cattle. He persisted and all died of either tuberculosis or heart disease.[36]

The easiest way to exterminate the Indian is to give him plenty of white flour and rum. Tuberculosis always follows.

There is no "royal road" to the cure of tuberculosis or its prevention. The various tuberculin treatments are based on the principle of injecting an attenuated dose of poison into the human system and—this poison, like strychnia and many other drugs, stimulates nature and in some lines by inflammation to cure the diseased lungs and joints. One that has been afflicted with cough, weakness, emaciation, pain and dread of impending death, would only too eagerly accept such a treatment, yet in its very best it only effects results, it does not touch causes, and when one sees men like Robert Koch wrestling on this line, while lives go out because they will persist in ignoring the causative relations of vinegar and vinegar yeast to tuberculosis, it makes one wonder at this neglect of general principles. So long as the cause is being put in the system,

so long will tuberculosis continue, and it is strange that these followers of Koch also ignore the positive relations of syphilis and scrofula to consumption. As far as I can learn the majority of medical men are using, as a basis of their treatment, animal food, but why should they gravitate to the other side and give the causes of the disease, to-wit, fermented milk foods, such as kumyss, etc., pastry, starches, sugars, vegetable foods of many kinds, that can not digest, because of the weakness of the bowels, salads that soon make swill, jellies and colloids, to name no more. These same men also neglect the value of the study of the morphologies of the blood, sputum, feces and urine, as laid down by American observers.

At whose door shall be laid the blame of the ignoring of the incalculable value of the diagnosis of the pre-tubercular state, which diagnosis can be made before the lungs are affected, and before there is any sputum to find bacilli in or diseased spots in the lungs for tuberculin to re-act on? This knowledge of the pre-tubercular state is of the greatest value to humanity of anything in the practice of medicine.

The Dr. Cyrus Edson treatment was based on so-called logical grounds as to certain relations of carbolic acid to the human body in tuberculosis, yet he adds pilocarpine to his remedy to stimulate white blood corpuscle activity. He therefore indirectly recognizes the presence of vinegar yeast in the blood and that anything which helps the action of white blood corpuscles will help the patient for a time. Why not put the ax to the root of the tree, and stop the formation of this vinegar yeast in the blood?

Some Europeans are now using raw beef. Why they do not give their patients broiled beef, I can not understand. Raw beef is unpalatable, it promotes tape worm. The use of beef is the bottom principle in the treatment of tuberculosis, but it should be employed in the form of steaks or roasts, or the first-class top of the round freed from connective tissues by machine or knife and chopping bowl, as the connective tissues are of a colloid nature, and ferment, and tend to the production of vinegar yeast. The lean muscle pulp is then molded into a cake, an inch and a half deep, several inches wide, not too tightly pressed together, and in all of its preparation care should be taken to touch as little as possible the meat direct by the hands as the human animal heat will change the character of the muscle pulp; broil this over a bed of good live coals, a gas stove, or even kerosene flame, turning often, and the resultant should be of a dark brown color on the outside and of a reddish but not raw appearance inside. It is best served on a hot water plate and if a little under-done, it will cook on the plate when the meat cake is opened. If a hot water plate can not be obtained, one can be extemporized by the use of a soup plate filled with hot water on which is placed another plate with the meat. There can not be too much care used in the buying of the beef or its preparation and if proper caution is taken, the patient will generally eat it with a relish. It should be seasoned with pepper, salt, butter, Worcestershire sauce, horse-radish, lemon juice, as the patient desires.

Lamb, mutton, the dark meat of fowl and game; broiled cod-fish can be used, as changes; the whites of eggs dropped in boiling water and slightly cooked may be taken freely if the patient is not eating enough of solid food. Some patients will take the whites of from one dozen to two dozen eggs in a day when weak and not able to take other food. Don't do as one woman did; she gave her husband the whites of eggs dropped in boiling water with plenty of vinegar. The masses of vinegar yeast in the blood were so large and frequent under the microscope that amazement was expressed. The woman protested that she was doing everything absolutely according to order for her husband. As all of his symptoms were worse and because of this blood morphology of the masses of vinegar yeast, it was insisted on that some error was being made and it was ascertained what she had done.

Vegetable food may be added as follows: Some patients can bear one of the following foods at a meal—cracked wheat, rice, hominy, toasted entire wheat flour bread, baked potato. It is a hardship at the best to confine patients to close diet and physicians should give them as much variety as possible, but there is more danger of error on the one side of too broad a diet than one of too narrow. The use of distilled water or some good spring water that has not more than five to ten grains of salt to the gallon should be persisted in, drank (after boiling) at a temperature of from 100 to 120 degrees Fahr. one hour before each meal and on going to bed.

Medicines should be employed in the treatment of tuberculosis on principles and the main one is give no medicine which can ferment into alcohol and vinegar in the alimentary tract. This principle forbids the prescribing of many cough syrups and other preparations now largely used.

The skin in tuberculosis is more or less loaded with the vegetations of vinegar yeast. There should be employed daily sponge baths. The water to be hot or cold according to the patient's desires. Ammonia and water in the proportion of two teaspoonfuls to a pint or the aromatic sulphuric acid one teaspoonsul to a pint or even the nitro-muriatic acid, one-half teaspoonful to a pint, can be used with great advantage; rubbing with a saturated solution of spirits and salicin is a good means of toning up the skin and the whole body.

Bacteria or bacilli are babies of vegetations which have become animalized by contact with the human body and human secretions. Robert Koch demonstrated their presence in the sputum of tubercular cases, for which he should receive due credit, but the work which antedates his in time and importance as showing the real couse of tuberculosis must not be ignored. The vinegar yeast found in the blood is the second stage of the bacteria, and is found there in the spore form and sometimes in tubercular cavities we get the third stage of development in the aerial filaments of the vinegar yeast.

Physicians could learn more as to relation of sour foods to tuberculosis in a few months time by experimenting on hogs (not guinea pigs or rabbits), by feeding a certain number with sour and a certain number with sweet foods, having all in the same building so that they breathe the same air. The beauty of this kind of work is that one can kill the animals any time one pleases and know just what is going on.

The agricultural experiment stations of the different States are fully equipped to make these investigations on hogs. It is necessary, however, that the microscopist who follows the experiments should have a fair working knowledge of the methods of the American observers who have been studying this subject for nearly thirty years on their patients and with animals. If it is right to rush abroad to Berlin to study cured

cases of tuberculosis, some of whom die the day after they are pronounced cured, there can be no harm in studying in America, all the work which made cured cases twenty-five years ago, for such cases are living now.

PROGNOSIS.

Granted a recognition of the relation of vinegar to tuberculosis, the prognosis can be more definitely made out, for if one is stopping a cause then one has some hope to base his belief of cure on. If one is simply treating results according to tuberculin methods and is still putting in the food which will undergo vinegary fermentation, the prognosis must necessarily be doubtful.

What is the experience of those who recognize the relation of vinegar and tuberculosis? Temperament here comes in. Some of the most appalling cases with many hemorrhages, with the evidence of cavities in both lungs unquestioned, as determined by physical examination of the chest and by the detection of the elastic and inelastic lung fibers in the sputum, have progressed most favorably under proper treatment. Others, who apparently had little disease, went down to death. The rule has had to be laid down that all cases except the moribund should have a chance for treatment. It is a most wonderful thing how nature endows these cases with hope. Some patients fight indomitably, and contrary to expectations they get well. It is not pleasant to look back and consider the amount of opposition which was placed in the path of those who twenty-five years ago were endeavoring to help these distressed patients.

But what will you do with cavities? The post-mortem evidences of many morgues and dissecting rooms show unquestionably that cavities do heal over and patients live to die of another complaint. My own wife showed three small cavities healed in the top of the left lung and two in the right. There was some fatty and calcareous degeneration going on in the base of the left lung; liver somewhat enlarged but normal in structure; no tuberculosis of stomach or bowels; heart normal in size and as to structure; yet all her symptoms for three years had been of heart exhaustion, needing the greatest of care and attention. Seven years before her death an eminent medical man stated that she had but three months to live; if her appetite for beef foods, and in fact for practically all other foods, had not failed three years before her death, she would probably have lived to old age. Of great courage, good judgment, she in her weakness for many months traveled close to the verge of the grave. Of strong affections, her love for her dear ones kept her alive a long time; yet something in her nervous system broke down as to appetite and her time eventually came.

It is cruel to take away from the very sick hope. There are many doctors of eminence and influence who literally are executioners because of their brutally taking away all hope. The passionate, anxious, eager holding on to life of the very sick is a matter of divine origin, and I do not propose to stand in the way of that divine gift of the desire for life.

Some patients die from money troubles. Others die from the long-continued opposition of their friends, relatives and medical men to treatment. It can be thankfully said that this opposition is dying out. Others die because they are associated in herds at the various resorts in the mountains of the South and West, and in sanatoria seeing and hearing the consumptives all about them. Such suffer for the privileges of home. They have many comforts taken from them and are liable in going South, of getting into a blizzard and have to live in a shelter which is improperly made.

I wish to emphasize that the treatment of tuberculosis must depend upon the family physician. It should commence in infancy; the children should be properly fed and taught to avoid sweets and the vegetable foods which do not agree with them, and those who are so unfortunate as to break down with the disease must still be kept at home, or such change of air and climate made as can do good and no harm. There is no question that good air is a wonderful thing, yet we can buy oxygen and force the air alimentation if necessary in our cities.

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SATURDAY, FEBRUARY 5, 1898.

MEDICAL LEGISLATION.

We wish to call the attention of our readers in the first place to Professor WELCH's article in this issue, which in detail sets forth the reasons why the "Anti-vivisection bill" now pending in the Senate and known as the "Gallinger bill" (Senate 1063), should be strenuously opposed by every physician.

Professor WELCH says truly that medical and scientific men have never had adequate opportunity to present arguments against the bill before the committee. The aim of the bill is to abolish animal experimentation altogether, and that concession now to the antivivisectionists whereby this bill would be allowed to pass, would be a fatal mistake and so handicap physiologic and therapeutic experimentations that further advancement would be almost out of the question.

He denies the statements in the committee report that any considerable number of medical or *bona fide* scientific men have favored the bill, and very easily disproves the claims that animal experimentation has been of no value to medicine. He further says that scientific experiments upon animals have not been conducted with cruelty, and states that no single instance of cruelty on the part of a scientific experimenter has been proved or set forth. He says that in England physicians there at first yielded to the passage of a similar bill and are now confronted with the fact that it is practically impossible to conduct proper experiments in that country, and even such men as Lord LISTER are obliged to go to the Continent to perform ordinary experiments.

We must therefore continue to urge upon the members of the ASSOCIATION and readers of the JOURNAL generally that they send personal protests to their Senator and Representatives, otherwise this most injurious and fanatical measure may pass the Senate.

In the matter of the Public Health Bill, the ASSOCIATION Bill has been introduced by Senator SPOONER of Wisconsin. It has been thought wise to change the title from "Department" to "Commission" of Public Health, which in effect means the same thing. We regret to say, however, that the bill which was introduced on the 27th of January, has (according to press reports) without conference or without consultation with anybody been reported unfavorably with unseemly haste by Senator VEST, who recommends instead a Marine-Hospital bill which was originally introduced by Senator CAFFERY, and to which we referred last week. It seems that Mr. VEST reported this bill favorably on the 19th of January last, but the favorable "report" consisted in striking out all the original CAFFERY bill after the enacting clause and giving the Marine-Hospital Bureau, under the Secretary of Treasury, authority to perform all sanitary matters throughout the United States, in case of epidemic riding rough-shod over every board of health or municipal authority which might possibly stand in the way. Both bills now go to the Senate calendar, the bill prepared by the AMERICAN MEDICAL ASSOCIATION and American Public Health Association with an unfavorable report, and that by the Marine-Hospital chief with a favorable report.

Every effort must be made to defeat this CAFFERY bill, Senate No. 2680, if the medical profession are not to be entirely overrun by this action of the Marine-Hospital bureau. If this arrogant scheme succeeds there is no longer any use for State or municipal boards of health. The Marine-Hospital Service will perform their duties for them, notwithstanding the fact that no medical man outside of this organization, or any medical society or set of medical men whatever, has asked for so sweeping a measure or one so contrary to all previous enactments in relation to the public health. The text of this despotic measure will be found in the public health column of this issue. If there be a State board of health in the Union or a municipal board of any consequence that does not fight it, we shall be very much mistaken.

Work hard and earnestly for the ASSOCIATION Bill as introduced by Senator SPOONER and may success crown our efforts!

THE ANOMALOUS, BRANCHING AND ACTINOMYCOTIC FORMS OF THE BACILLUS OF TUBERCULOSIS.

In the two first editions of "Les Bactéries," 1883 and 1886, by CORNIL and BABES, branching forms of the tubercle bacillus are described and figured. These bacilli were derived from old cultures.

In 1888 NOCARD and ROUX,[1] and METSCHNIKOFF,[2] each described in the cultures of avian turberculosis

kept at high temperature the formation of capsules and curious rarefied and swollen forms. METSCHNIKOFF has also seen that the tubercle bacillus situated in the interior of giant cells can surround themselves with thick capsules, and BABES has described various forms of granules, metachromatic corpuscles, vacuoles, clubs and branching organisms, and their relation to the bacillus of tuberculosis.

FISCHEL[3] and COPPEN JONES[4] maintain that the bacillus of tuberculosis is not a bacterium but a fungus of a higher type, because it may present ramifying threads, clubs and metachromatic corpuscles. They are inclined to urge that it could be placed side by side with the actinomyces, because it may form a mycelium when it is deprived of air.

These ramifications are genuine branches. COPPEN JONES found, in the sputum, anomalous forms of tubercle bacillus that corresponded exactly in structure to the club-shaped masses characteristic of the actinomyces. In this connection it is interesting to recall that the lesions produced by the tubercle bacillus and by the actinomyces are closely related, both being classed as infectious granulomatous processes. Furthermore, that the patients affected with actinomycosis react more than others, except the tuberculous and lepers, to the action of KOCH'S tuberculin, showing, it would seem, an analogous composition of the substances that produce the reaction in the patient's body.

BABES[5] established that the club-shaped masses of actinomyces are formed by a secretion of the terminal extremities of the ramifying filaments. They constitute a sort of capsule and appear to play the rôle of protection for the organs of reproduction. BABES has also shown that the filaments of actinomyces are stained a bluish violet by GRAM'S method, while the club-shaped masses are stained red by a solution of safranin and anilin oil, followed by the action of LUGOL'S solution.

MARPMANN[6] found, in a sputum very rich in normal bacilli, bacilli with club-shaped thickenings with distinct branchings, and also a few rather long threads. He observes that the tubercle bacillus belongs to those fungi which form true cellulose in the cell protoplasm and which give the reaction for cellulose. Such bacteria are, so far as known, all aerobic. Cellulose is not formed in anaerobic cultures.

FRIEDRICH[7] succeeded in finding branching forms of the tubercle bacillus in the midst of the tissues, in cases of rapid experimental miliary tuberculosis. He produced such disease by injecting into the arterial circulation from the carotid artery of rabbits tubercle bacilli in physiologic salt solution. The animals died in from twenty-four to eighty-six hours, and the miliary tubercles were then found in the majority of the organs. When the tissues were stained by the usual methods (EHRLICH, ZIEHL, NEELSEN) the bacilli did not present any unusual appearances either in regard to form or arrangement. In the case of the animals which died during the first thirty days after the injection, the author succeeded in demonstrating the bacilli in the tissues arranged in a radiating form and provided with clubbed ends such as are characteristic of actinomyces. He succeeded in finding all these ends by means of staining with Victoria blue, differentiating with acid alcohol, and then staining with a solution of eosin and water. Because these peculiar forms appeared to be characteristic of the first stages of the disease, FRIEDRICH is inclined to believe that the view that the clubs observed on the actinomyces are degenerative forms, is erroneous.

BABES and LEVADITI[8] injected into the meninges of the brain of rabbits pure cultures of tubercle bacilli of slight virulence. They found that two or three days later the bacilli had formed undulating threads and filamentous masses, surrounded by polynuclear leucocytes. At the beginning of eight or ten days the filamentous masses were found presenting radiating peripheral terminations. Such masses may have a diameter of from 20 to 80 micromillimeters. They are constantly surrounded by a zone of polynuclear leucocytes containing a few typic bacilli. About a month after the inoculation the filamentous masses were found to have acquired a diameter of from 40 to 80 micromillimeters and that they were very much like grains of actinomyces, the center being occupied by a substance which stained rose-red by EHRLICH'S method and in which were again recognized a network of threads of the thickness of the tubercle bacillus, and from this central network projected free ends, sometimes a little thickened, at other times assuming a distinct club shape. By GRAM'S method the mycelium could be stained a violet blue, the club-shaped masses red by means of anilin oil, safranin and LUGOL'S solution (like the actinomycetes). GRAM'S method alone gave an isolated stain to the mycelium. The various pictures obtained are reproduced in the plates that accompany the article. The authors think it is not impossible that one may some day find that some of the apparent forms of human or animal actinomycosis are produced by the bacillus of tuberculosis, because they can not understand why such conditions may not at some time or other be produced, as they produced experimentally in their actinomycotic form of tuberculosis. It should not be neglected to examine cases of actinomycosis by the methods which are usually applied to

1 Annales de l'Institut Pasteur.
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the tubercle bacillus. When one takes into consideration the composition and the form of these peculiar growths of the tubercle bacillus it becomes necessary to bear in mind the advisability of placing this bacillus in the same group as the actinomyces, that is to say, in a family intermediate between the bacteria and the *ascomycetes*. HAYO BRUNS[9] proposes to call the bacillus of tuberculosis the myco-bacterium of tuberculosis, because of the occurrence of branching forms.

VITAL STATISTICS OF THE ELEVENTH CENSUS.

"Part I of the Report on Vital and Social Statistics in the United States at the Eleventh Census, 1890" has just been received from the Government Printing Office by the Superintendent of Documents, Department of the Interior. It is a large quarto volume of nearly 1100 pages handsomely illustrated with colored maps showing the distribution of mortality during the census year. The rates are presented and discussed by Dr. J. S. BILLINGS, Deputy Surgeon-General, U. S. Army, retired, as expert special agent on the subject of vital statistics. The data used in this voluminous report differ in completeness and accuracy according to the locality in which they were gathered. In a large part of the country the only record of deaths to be had was that obtained by the census enumerators as the result of inquiries in each family and this is considered to be deficient by from 20 to 50 per cent., but from the States of Massachusetts, Connecticut, New Hampshire, Vermont, Rhode Island, New York, New Jersey, Delaware and the District of Columbia and from a large number of cities outside of these States fairly complete records were obtained from the local health authorities. The death rate for the whole country was 13.94 per 1000 living, but for the States and cities having a good system of registration it was 20.38. In the latter the rate of the urban population was 23.48, of the rural population 15.66. In the non-registration areas the enumerators gave a death rate of 10.86 per 1000 as compared with 13.42 in 1880, whence it is concluded that either the healthfulness of the country has increased or that the enumerators' returns, as regards deaths, were less complete in the eleventh census than in 1880.

The death rate of males was generally higher than that of females, 21.54 as against 19.25 per thousand. The excess of male deaths occurred chiefly at the earlier ages. The death rate for white children under 5 years of age was 64.21; highest in the metropolitan district, 88.48; lowest in the rural districts of the registration States, 36.72. For colored children of the same age the rates were much higher, varying from 56.48 in the rural sections to 151.60 in the metropolitan district; and in all localities the male death rate was higher than the female. The deaths of children under one year of age gave an infantile mortality of 115.65 per 1000, still-births being included in the births and deaths. Were the still-births excluded the infantile mortality would be 97.60. In the registration areas this mortality was 182.25 or higher than in Great Britain and Ireland, Denmark, Sweden, France and Belgium, but lower than in the Netherlands, Italy, Switzerland, Prussia, Saxony and Bavaria.

The death rate of the colored population in the registration area was much higher than that of the whites, 32.40 as compared with 20.22 per 1000, the excess of mortality being most marked in the younger years.

For the married in the registration area the death rate for those 15 years and over, taken as a whole, was higher than for the single in the same age group, and was higher among males, 16.66, than among females, 13.42. If, however, the age group 15 to 45 years be taken, the death rate of the single males, 9.29, was higher than that of the married males, 8.95, while the death rate of the married females, 9.63, exceeded that of the married males and also that of the single women, 6.79. In the age group 45 to 65 years the death rate of the single males, 31.29 was much higher than that of the married men, 19.83, and the death rate of the single females, 22.0, exceeded that of the married women, 16.80. Many statistics in this connection show the relative death rates from various diseases, according to age and conjugal condition. Then follows a section on occupation in relation to death. The highest death rate occurred among the laboring and servant class in cities, 25.15; the lowest among the clerical and official class, 7.69. The rates for certain trades and occupations were higher than the average male rates for the same ages. The persons subject to these high rates were musicians and teachers of music, apothecaries and pharmacists, butchers, bakers, confectioners, barbers, bookbinders, plasterers and whitewashers. For all other occupations the rates were lower than the average. Among males in the professional class of occupations in the registration districts the death rate per 100,000 of their number from diseases of the nervous system, 250.70, was higher than the average rate, 158.96, from these diseases in all selected occupations. The rate for diseases of the respiratory system was also higher, but that for consumption was considerably lower. The death rate from suicide was higher in this than in other classes. There was no death among physicians and surgeons under 25 years of age in the registration States during the census year. The death rate of medical men from 25 to 45 years, 9.52 per 1000, was slightly above the average rate of the professional class at this age, 8.47, as was also the rate at 45 to 65 years (physicians and surgeons 21.15, professional class 19.11), but the death rate at 65 years and over, was much higher than the average of the professional class.

In fact, this census report contains a mass of information under the heading "Occupation in Relation to

[9] Centralb. f. Bakteriologie, xvii.

Death," sufficient to provide trade journals with interesting paragraphs for many a week to come. The influence of season and locality are then discussed, but the greater part of the volume is given up to a study of the causes of death. This report will be valued highly by those interested in sanitary questions concerning deaths and death rates.

PHTHISIS AND INSANITY.

The close relations of tuberculosis to insanity have been matters of observation and comment since the days of ESQUIROL and GEORGET and the other early alienists of the modern period. The fact that the mental symptoms of phthisis were notably characteristic had also been still longer a matter of common observation and naturally assisted in calling attention to these relations and suggested a direct connection between the two. When more recent clinical studies had shown that tuberculosis was not only exceedingly common in the insane, but that a hereditary tendency to the one was often associated or alternated with that to the other disorder the relations of the two became still more striking and suggestive.

In former times, not so very remote, the mortality from tuberculosis among the insane exceeded that for almost any other complication; a distinguished French authority reckoned that at least one-third of the deaths were to be attributed to lung affections and usually to this one. Within very recent times, CLOUSTON, who is certainly a good authority on this subject, estimates that while the mortality from this cause has been greatly reduced, under the best conditions, the proportion of the insane in asylums who die from tubercular lung troubles is still three times as great as that of the average population outside. How much of this discrepancy is due to the general lowering of resistance to the disorder, to trophic debility from the as yet imperfectly understood brain abnormalities of the mental disorder and how much to the enforced sedentary life and to the congregation of the inmates, many of whom must be necessarily infected, is uncertain, but that both of these factors are in play is more than merely probable. Asylums or hospitals for the insane are almost inevitably overcrowded, at least that is true of the public ones; their inmates are notoriously neglectful of sanitary rules and even the utmost care by physicians and attendants can only partially compensate for these unavoidable drawbacks. Under such conditions it is only remarkable that in times past, before the infectious and contagious nature of phthisis was recognized, all our asylums were not perfect hotbeds of the disease, and that any other affections had a chance to figure to any extent in their mortality statistics. It is only within late years that special infirmary wards have been the rule or at least common in asylums; the consumptives are not yet commonly isolated; the prevention of the spread of the infection is seriously embarrassed by the mental conditions and habits of the patients, and yet ordinary attention enlightened by a better knowledge of the nature of the disease, has probably reduced the mortality from this cause by one-third or one-half. That in the former times of our ignorance the tuberculous death rate was no greater than it was and that even remarkable recoveries took place and postmortems revealed in old chronic cases the cicatrices of cured tuberculosis, goes far to make one believe in a general comparative immunity or the non-malignancy of the infection. It has been proposed by some zealous sanitarian alienists to build isolation wards for consumptives apart from the ordinary wards or the infirmaries, and thus to stamp out or absolutely prevent the spread of the disease. Apart, however, from the reluctance of authorities to appropriate funds for what does not appear to them imperatively necessary, there is some question whether such provisions would be as effective as anticipated. Tuberculous disease is not as readily discoverable in the insane as in the sane; many of the characteristic symptoms are apt to be wanting, and the condition may be far advanced before recognition, even by a careful physician. Inasmuch as postmortems show that one person in every four or five has been affected with tuberculosis at some time or other, it seems probable that such isolation wards would only receive the well-marked cases, while less obvious cases would be constantly being received and circulating amongst the other patients. The possibility of infection may thus be still almost as great as ever, and probably even greater, from the false security preventing the watchful care on the part of those in immediate care of the patients not thus isolated. However desirable such accommodations may be, they are not an absolute security, and much can be done without them by the use of the ordinary sanitary precautions especially applicable to this disease.

Whether there is a special form of insanity caused by tuberculosis may be questioned by some, but it appears to be the experience of alienists that a certain type of suspicious melancholia is most frequently associated with this disorder. In paretics also, with whom the delusions are so generally of an expansive nature, they are apt to take on a melancholic type when associated with consumption. The exact relations of the insanity and the tuberculosis are not altogether clear; the mental disorder usually, according to CLOUSTON, antedates the other. but the latter can be often foretold by the character of the insanity. The prognosis of the mental disorder in these cases is not as good as when uncomplicated by phthisis, while the restoration of mental soundness is sometimes apparently facilitated by the lung disorder in cases of the expansive type of insanity. It would appear that this special depressive type of mental disease either par

ticularly favored the outbreak of phthisis or that it itself was often an early symptom of latent tuberculosis. Whichever of these views is accepted, the fact of their apparent relations is interesting and suggestive, and the designation of phthisical insanity appears to be warranted in the classifications.

The fact of the so frequent common heredity of phthisis and insanity, already referred to, affords another ground for suspicion of their close relations. CLOUSTON indeed believes that a combined heredity of the two is more perilous as regards the probability of either disease than the same of either one singly. That is, he holds that a person with one parent tuberculous and the other insane is more liable to both insanity and consumption than one who has both parents suffering from one of these two disorders.

As an evidence of the improvement that has taken place of late years in the asylum mortality from pulmonary tuberculosis, the statistics of seven American hospitals taken without special selection for a period of ten years, from 1888 to 1897 inclusive, gave a mortality of 22 per cent. Taking out one of these with the highest mortality from this cause the percentage was 17. Six American hospitals similarly taken, of which only the figures for 1897 were available, gave a percentage of 13.7, while withdrawing one of these with the exceptional percentage of 57.69, the mortality from phthisis of the remaining five was only 9.4 per cent. of the total deaths. It seems entirely beyond question that tuberculosis, even under the comparatively unfavorable conditions afforded by the insane in hospitals as at present managed and equipped, is to a large extent a controllable disease.

CORRESPONDENCE.

The Apothecary.

CHICAGO, Jan. 15, 1898.

To the Editor:—Several of my medical friends have called my attention to an article in your issue dated Dec. 15, 1897, under the heading "Is the Apothecary Shop Doomed?" Whoever wrote said article seemed to be under the impression that such is the case, but being an apothecary shop-keeper myself, I beg to differ with the gentleman. Facts will not bear him out and I hope to be able to explain that the apothecary is still alive and as long as there are physicians there will and must be pharmacists.

Twenty-five years ago, when I entered the pharmaceutic field, matters were widely differently from what they are today. The average druggist, as we called them then, had no education, merely a training. The boy started in some drug store by washing bottles, scrubbing the floor and other manual work. Gradually he worked his way behind the so-called prescription counter and within a few months' time he emerged a full fledged pharmacist. Education at that time was not compulsory; there were no pharmacy laws, no board of pharmacy, etc.

Matters are widely different today. The law, as faulty as it is, has accomplished a good deal. The boy who enters the pharmaceutic field must show some qualifications or he can not register as an apprentice. When through his apprenticeship he must either attend a respectable college or take up his studies at home, as he must go before the board of pharmacy and pass an examination as registered or assistant registered pharmacist. He can not serve as clerk or manager or proprietor except he has given proof of a thorough knowledge of materia medica, chemistry, botany and all the branches connected with pharmacy. So you find him fully prepared to enter the pharmaceutic field; years of practical and theoretic learning have been spent, but what does he really find? Any number of physicians who are not able to write a prescription, machines who are merely acting as figureheads for the so-called "manufacturing pharmacist or chemist." They write for patent nostrums, articles they do not know themselves, they merely take the manufacturers' word for it. For instance, he specifies pil. rheumatic (Jones), not even knowing the different ingredients, merely knowing Mr. Jones, a large manufacturing chemist, as more able to prescribe than himself. If you ask the doctor why he prescribes such stuff he merely must acknowledge Mr. Jones' agent had talked him into it. This is the advanced age of medical profession and what the apothecary finds when he enters on his duties. Who lowers the pharmaceutic profession? Nobody but the physician, He uses Jones' tablets because they are handy and cheap and principally because the agent has assured the physician they will cure any ill from a headache down to a corn. If the physician would take the trouble and do a little more studying, get acquainted with the U. S. Pharmacopeia and Dispensatory he would not waste his time on such representative but prescribe what his brain will indicate and not Mr. Jones' agent. If such would be his case the public would be greatly benefited and the medical as well as pharmaceutic profession would rank a great deal higher. Your correspondent says, we merely act as agent for the wholesale druggists, but forgets the physician is merely a tool of the manufacturing chemist. We are compelled to load down our shelves with a dozen and more makes of pills, elixirs, tablets, fluid extracts, etc., merely to please the physician and his good ally, the manufacturing chemist. A certain doctor told me a few years ago if I used Squibb's fluid extract of ergot instead of the one he specified he would consider me a substitute, while every apprentice knows this is a standard preparation and can not be excelled. Against such stupidity even a pharmacist is powerless. You say a girl in a factory who does not know the difference between epsom salts and senna leaves is better fitted to make a pill or an elixir than a pharmacist, who has studied for years, who has spent time and money to be efficient in his profession. Is it necessary to answer such a silly question? A first-class pharmacist will not prescribe but will remain within his domain and merely fill prescriptions, but the physician retaliates by taking the bread and butter out of the druggist's mouth by dishing out samples to his patients which have been left at his office by the manufacturing chemist and which the poor patient must swallow merely to give the manufacturing chemist a chance to get rid of his well advertised compounds. Why not carry printed prescriptions to accommodate the manufacturing chemist, or still better, let the mule follow the doctor loaded down with the different packages of the manufacturing chemist; have them labeled by numbers to fit the sickness. Your correspondent ought to know by this time that toilet articles, perfumes, face powders, etc., are taken out of the hands of the retail druggist. The dry goods store, the department store, etc., have complete control of those lines and I hope they will keep it. A first-class pharmacist will not buy any tinctures, elixirs or ointments; he will take pride in making such preparations himself, except his friend, the doctor, compels him to purchase such goods by specifying a certain make. Compare the average druggist's tincture or infusion with the one you recommend and you will find the one is made from carefuully selected herbs or roots, while the large manu-

facturer's make is rarely up to standard. The principal reason why the doctor should not dispense is a plain one. The pharmacist is a safeguard to the physician. No matter what mistake the doctor makes the efficient, educated pharmacist will correct it and many a life has been saved on that account.

The lot of the pharmacist is surely not a happy one. He is the servant of the people. He merely lives for them. He strains every nerve to accommodate the doctor as well as the general public, and what does he get for it? The physician allies himself with the manufacturing chemist to enrich him and to help himself, and the dear public wonders why men make such fools out of themselves.

But in spite of the manufacturing pharmacist, or better called manufacturing patent medicine maker, the apothecary shop-keeper will continue to exist and better days are in sight for him. Yours very respectfully, E. v. HERMANN.

"Poor Carrasquilla."

NEW YORK, January 31, 1897.

To the Editor:—"A discussion of serum treatment followed, in which poor Carrasquilla suffered. Excepting by his own countrymen, no results were reported from the use of his discovery, and the Germans, the English and others came down in full force to deny not only the usefulness but to argue dangers from its employment. . . . Poor Carrasquilla, to have traveled so far and yet found so little at the end of his journey."—*New Orleans Medical and Surgical Journal*, December, 1897, Special Correspondence on "The Berlin Leprosy Conference."

When the lion was sick, every beast whom he had wronged in his life came to have a blow at him; and when the ass had for some time contemplated this spectacle, with growing courage he actually went and tried a kick of his own. Such a thing happens frequently among men; but, whoever plays the donkey in such a case let him make quite *sure that the lion is past revival.*

Poor Carrasquilla! His serum treatment has been cold-shouldered in Berlin; he who had gone, his heart so full of hope, returns crestfallen; Dr. Dyer weeps over him, for when he read his paper on antivenomous treatment of leprosy, it was received with bated breath and was generally considered *startlingly bold*, and Dr. Dyer, thus encouraged (for he is, I suppose, responsible for the utterances of his co-editor) thought that his ideas would *revolutionize* the treatment of leprosy all over the world. This is interesting. Does not Dr. Dyer think that if anybody should have proposed to cure leprosy by roasting one side of a leper's body, such a proposition would also be listened to with bated breath? Such a treatment would probably be considered also as *startlingly bold.* Yet, would this checked breathing of a startled conference entitle Dr. Dyer to hope that the treatment of leprosy would be revolutionized by the views he exposed with such tremendous effect. How does he reconcile this hope, proclamed with such a strange flourish of trumpets, with the conclusions arrived at by his adored conference ("long live the Berlin conference!")? *Has Dr. Dyer any logical fiber at all?*

It seems to me that if Dr. Carrasquilla is to be called poor, he who has at least some intelligible theory to stand upon, Dr. Dyer would deserve the name of a poor beggar, for his pretensions are based upon nothing at all.

ALBERT S. ASHMEAD, M.D.

Rubaiyat—a Persian Quatrain.

CHICAGO, Jan. 15, 1898.

To the Editor:—In your review of the book, the "Rubáiyát of Doc. Sifers," you fail to tell us what Rubáiyát means. Will you kindly supply the defect? Yours very truly, S.

ANSWER—We quote the following from a work in the Public Library on Persian literature: "His poetry is wholly composed of independent stanzas, called Rubáiyát, consisting each of four lines of equal, though varied, prosody; sometimes all rhyming, but oftener the third line a blank. As usual with such Oriental verse, the Rubáiyát follow one another according to alphabetic rhyme—a strange succession of grave and gay. . . At all events each Rubá'iy is a separate poem and, however composed, finds its place in the manuscripts in accordance with its alphabetic arrangements and not its content. The late M. J. Darmesteter describes the Rubá'iy as a poem complete in itself, with its own unity of form and idea, and when wielded by a genuine poet unequaled in force by any other kind of Persian verse, the repetition of the rhymes enveloping and accentuating the silence of the third line, which is generally left blank, producing harmonies and contrasting sounds calculated to give a peculiar relief to the harmonies and contrasts of the idea."

Do Adult Squirrels Castrate Each Other?

CHICAGO, Jan. 25, 1897.

To the Editor:—I have read with much interest Dr. Edmund Andrews' article on "The Oriental Eunuchs," in the JOURNAL, Jan. 22, 1898, wherein speaking of the castration of animals and says anent squirrels: "Naturalists state that the black or gray male squirrels in fighting seek to castrate each other with their teeth, so that many of those taken by hunters are thus mutilated. As they do it only in adult life it does not materially change their general development." Commenting upon this, later, in a letter to the JOURNAL dated Jan. 25, 1898, he quotes the observations of Dr. A. S. Allen.

Being somewhat of squirrel-hunter myself I wish to confirm the report of Dr. Allen. I should say that fully one-half the male squirrels I have noticed were castrated. This is always done in early life, not merely in the nest as described by Dr. Allen, but also after they begin to run. It is always done by the male parent. The young are chased from limb to limb and tree to tree until exhausted, when the old ones deliberately remove the testes and scrotum clean from the body. The practice is not confined to the gray squirrel. I have noticed it more frequently among the large fox squirrels found in Illinois.

I believe such an operation to be impossible among adult animals engaged in battle. The operation is, in most cases, done so neatly with their sharp teeth that no vestige of tissue remains. At first I took it for granted that they were all females, although I could not account for their large size. The large size of these animals, the perfectly healed wounds and the seeming impossibility of performing such a neat operation in a fit of anger, as suggested by naturalists, would forbid the conclusion that such operations are ever performed in adult life. The castrated are much fatter than the perfect males.

The only cause which I could assign for this methodical operation is that of jealousy, which is shared by the farmer who lives in the vicinity.

The practice may be taken in its mental origin to the sexual mental state underlying the driving forth of young males by the old ones among social animals.

EUGENE S. TALBOT, M.D.

PUBLIC HEALTH.

The "Caffery Bill" as reported to the Senate January 19, by Senator Vest.—That "An Act granting additional quarantine powers and imposing additional duties upon the Marine-Hospital Service," approved February fifteenth, eighteen hundred and ninety-three, be amended by striking out the following words in section one: "And with such rules and regulations of State and municipal health authorities as may be made in pursuance of or consistent with this Act," and striking out section three and inserting the following in the place of said section:

"SEC. 3. That immediately after the passage of this Act the Secretary of the Treasury shall make such rules and regulations as are necessary to prevent the introduction into the United States of any infectious or contagious disease from any foreign port or place, or the spread of such diseases from one State or Territory, or the District of Columbia, into another State or Territory, or the District of Columbia, and such necessary rules and regulations as shall be observed by vessels or vehicles departing from foreign ports or places for ports or places in the United States to secure the best sanitary condition of such vessels or vehicles, their cargoes, passengers, and crews, which rules and regulations shall be published and communicated to and enforced by consular, quarantine, and customs officers of the United States and the State and local quarantine officers of the United States. All rules and regulations made by the Secretary of the Treasury shall operate uniformly, so far as climatic conditions will justify in the interest of the security against the introduction or spread of said infectious and contagious diseases, and shall not discriminate against any port or place. None of the penalties herein imposed shall attach to any vessel from a foreign port, or owner, or officer thereof, until a copy of this Act, with the rules and regulations made in pursuance thereof, has been posted up in the office of the consul or other consular officer of the United States for ten days in the port from which said vessel sailed, and the certificate of such consul or consular officer, over his official signature, shall be competent evidence of such posting in any court in the United States.

"At any port or place in the United States where the Secretary of the Treasury shall deem it necessary for the prevention of the introduction of contagious or infectious disease from a foreign port or place that incoming vessels, vehicles, or persons shall be inspected by a national quarantine officer, such officer shall be designated or appointed by the Secretary of the Treasury on recommendation of the Surgeon-General of the Marine-Hospital Service, and at any such port or place no vessel, vehicle, or person from any foreign port or place shall be admitted to entry or enter without the certificate of said officer that the United States quarantine regulations have been complied with.

"Any vessel sailing from any foreign port without a United States consular bill of health, and arriving within the limits of any collection district of the United States, and not entering or attempting to enter any port of the United States, shall be subject to such quarantine measures as shall be prescribed by regulations of the Secretary of the Treasury, and the cost of such measures shall be a lien on said vessel, to be recovered by proceedings in the proper district court of the United States and in the manner set forth above as regards vessels from foreign ports without bills of health and entering any port of the United States.

"National quarantine stations now in operation shall be conducted in accordance with the provisions of this Act, and the Supervising Surgeon General, with the approval of the Secretary of the Treasury, is authorized to designate and mark the boundaries of the quarantine grounds and quarantine anchorages for vessels which are reserved for use at each United States quarantine station; and any vessel, or officer of any vessel, or other person trespassing upon such grounds or anchorages, in disregard of the quarantine rules and regulations, shall be deemed guilty of a misdemeanor and subject to arrest, and, upon conviction thereof, be punished by a fine of not more than three hundred dollars, or imprisonment for not more than one year, or both, in the discretion of the court.

"And any master or owner of any vessel or any person violating any provision of this Act or any rule or regulation made in accordance with this Act, relating to inspection of vessels, or relating to the prevention of the introduction of contagious or infectious diseases, and any master, owner, or agent of any vessel making a false statement relative to the sanitary condition of said vessel or its contents, or as to the health of any passenger or person thereon, shall be deemed guilty of a misdemeanor and subject to arrest, and, upon conviction thereof, be punished by a fine of not more than five hundred dollars, or imprisonment for not more than one year, or both, in the discretion of the court.

"Medical officers of the United States, duly clothed with authority to act as quarantine officers at any port or place within the United States, and when performing such duties, are hereby authorized to take declarations and administer oaths in matters pertaining to the administration of the quarantine laws and regulations of the United States.

"The Secretary of the Treasury shall, whenever in his judgment it is necessary, make rules and regulations to prevent the introduction of infectious or contagious diseases into one State or Territory or the District of Columbia from another State, Territory, or the District of Columbia, and when such rules and regulations have been duly made they shall be promulgated by the Secretary of the Treasury and enforced by the sanitary authorities of the States and municipalities when the State or municipal authorities will undertake to execute or enforce them; but if the State or municipal authorities shall fail or refuse to enforce said rules and regulations, or other rules or regulations made under the provisions of this Act, the President shall execute and enforce the same, and adopt such measures as in his judgment shall be necessary to prevent the introduction or spread of such diseases, and may detail or appoint officers for that purpose.

"Whenever yellow fever, cholera, plague, or typhus fever has passed the quarantines of the United States, or in any manner any one of these diseases has gained entrance or has appeared within the limits of any State, Territory, or the District of Columbia, the quarantine regulations of the United States, prepared under the direction of the Secretary of the Treasury, for the purpose of preventing the spread of such diseases from one State, Territory, or the District of Columbia into another State, Territory, or the District of Columbia, shall be supreme and have precedence of State or municipal laws, rules, or regulations, and the President is authorized to enforce the same and to control the movement of vessels, railway trains, vehicles, or persons so as to prevent these diseases from spreading from one State, Territory, or the District of Columbia, to another State, Territory or the District of Columbia, and to prevent unnecessary restrictions upon interstate commerce; and whenever, in accordance with the rules and regulations made as herein authorized to prohibit or permit the movement of vessels, railway trains, and vehicles, or transportation of persons, prohibitions or permits have been made or granted, any person violating said prohibition or permit shall be deemed guilty of a misdemeanor, and shall be subject to a fine of not more than one thousand dollars or imprisonment for not more than twelve months, or both, at the discretion of the court; and any violation of said prohibition or permit shall be reported to the United States district attorney for the district in which the offense has been committed, who shall thereupon institute necessary proceeding for the recovery of the penalty herein imposed."

That section six of said Act shall be amended to read as follows:

"That on the arrival of an infected vessel at any port not provided with the proper facilities for treatment of the same, the Secretary may remand said vessel, at its own expense, to the nearest national or other quarantine station where accommodations and appliances are provided for the necessary disinfection and treatment of the vessel, passengers, and cargo; and after treatment of any infected vessel, or inspection of any vessel not infected, at a national quarantine station, and after certificate shall have been given by the United States quarantine officer at said station that the vessel, cargo, and passengers are each and all free from infectious disease or danger of conveying the same, said vessel shall be permitted to enter and admitted to entry at any port of the United States named within the certificate. But at any ports where sufficient quarantine provision has been made by State or local authorities, the Secretary of the Treasury shall direct vessels bound for said ports to undergo quarantine at said State or local station."

That section eight of said Act shall be amended to read as follows:

"That whenever the proper authorities of a State shall surrender to the United States the use of the buildings, grounds, and disinfecting apparatus at a State or municipal quarantine station, the Secretary of the Treasury shall be authorized to purchase them at a reasonable compensation, or pay a reasonable rental for their use, if in his opinion they are necessary to the United States; and the expense of said purchase or rental is made payable from the epidemic fund.

"That the Surgeon-General of the Marine-Hospital Service shall, whenever he may deem it necessary, appoint in each port exposed to yellow fever, or where such disease has ever been introduced, a port sanitary inspector, who shall have been a practicing physician for at least five years before his appointment at said port, and who shall be familiar with the symptoms of the disease hereinbefore mentioned, and skilled in its prevention and treatment.

"It shall be the duty of the port sanitary inspectors or quarantine physicians so appointed to make careful examination of the sanitary condition and surroundings of the ports where they reside and for which they are appointed, and to report each month, or oftener, if required so to do, the facts as to the sanitary condition of such ports to the Surgeon-General of the Marine-Hospital Service, with such suggestions and recommendations as they may think necessary and proper. The said

port sanitary inspectors shall perform such other duties in treating yellow fever or other infectious diseases as the Surgeon-General of the Marine-Hospital Service shall direct; and they shall each be paid from the Treasury, upon vouchers signed by the Surgeon-General of the Marine Hospital Service, the sum of one thousand dollars annually, payable, in equal quarterly installments, on the first days of January, April, July, and November.

Osteopathy.—Decision rendered in the Appellate Court of Illinois, Third District, November term, 1896.

Eugene H. Eastman v. the People, etc., Wall, J., Appeal from Jersey County Court.

This is an appeal from a judgment for $100 as a penalty for practicing medicine without license, under Par. 10, Ch. 91, R. S. It appears that the appellant was engaged in the practice of "the profession of osteopathy," as it is termed in the briefs; that he had an office where he received patients, and that he visited patients at their homes; that he advertised his system and his skill therein by publications in the newspapers and that he professed ability to understand and treat human ailments intelligently and successfully.

So far as shown his treatment consisted wholly of rubbing and manipulating the affected parts with his hands and fingers and by flexing and moving the limbs of the patient in various ways.

It is insisted on his behalf that because he used no medicines or instruments he is not amenable to the statute.

Par. 14 of Ch. 91 declares that "Any person shall be regarded as practicing medicine within the meaning of this Act who shall treat, operate on or prescribe for any physical ailment of another."

It is argued on behalf of appellant that this provision must receive reasonable interpretation, and that to "treat" implies the use of medicines or drugs of some sort, and to "operate on" implies the use of instruments of some sort. This is not so necessarily. Many of the minor operations are effected without the use of instruments by mere pressure, extension and flexing.

This of course implies some knowledge of anatomy and some skill. So, many forms of disease are treated by attention to the diet, habits and mode of life without resorting to medical remedies.

It is said by counsel that if the statute reaches this case it must include treatment by Turkish baths, massage and the like. We think not. The evidence shows that appellant held himself out as competent to treat and cure numerous diseases, such as all forms of fevers, cerebrospinal meningitis, catarrh, diphtheria, croup, pneumonia, asthma, indigestion, dysentery, kidney diseases, measles, paralysis and many others, including in fact a large proportion of the ailments common to mankind. He represented himself as a graduate of the new school of "Osteopathy" and held himself out as qualified to examine and treat all who might seek his aid. Herein he differs from those who give Turkish baths, massage and the like.

He professes to be able to diagnose and advise in respect to a long list of diseases and to furnish discriminating and efficient treatment to those who may come to him, and while he may rely wholly upon manipulation, flexing, rubbing, extension, etc., yet he professes to have skill and judgment in these methods, so as properly to adapt the treatment to each case, giving it what is appropriate in amount and with repetition at such times and to such extent as may be dictated by his knowledge and experience. By his skill in the use of his peculiar remedies or methods he claims to be competent to relieve and cure various ailments, and therefore he invites patronage. We are referred to the case, Smith v. Lane, 24 Hun. 632. The statute of New York is unlike ours, and the facts of that case are unlike these in the case at bar. We think the ruling there should not control here.

It is suggested rather than argued that as the title of the act in question is "An Act to regulate the practice of medicine in the State of Illinois," and as the constitution provides that no act shall embrace more than one subject which must be expressed in the title, any construction which would include a matter not within the practice of *medicine* must be avoided or the Act is unconstitutional.

"Medicine is the art of understanding diseases and curing or relieving them when possible."—Bigelow. "It is that branch of physics which relates to the healing of diseases."—Dunglison.

This act is not restricted to any particular methods or remedies. Indeed these are almost innumerable, considering what are used and what have been discarded.

We are of opinion the proofs bring appellant within the act and that he is liable to the penalty imposed thereby for practicing medicine without license.

It is urged the court erred in refusing to dismiss the suit for want of authority of plaintiff's attorney to institute the action.

It is shown by a recital of the clerk in the order of record that such a motion was made and overruled and that the defendant excepted.

This entry by the clerk in the orders of the court for the day is not sufficient to save the exception, and if it were there is nothing to show that the motion was supported by anything requiring the action of the court. Such a motion should be supported by affidavit or some matter of which the court should take notice, and must be preserved by a bill of exceptions. The judgment will be affirmed. *Affirmed.*

Filed June 16, 1897. W. C. Hippard, Clerk, Appellate Court, Third District.

Defendant paid fine and left the State.

The State Board of Health have won the fight.

Validity of Health Ordinance Prohibiting Sale of Fresh Pork.—The city council of Helena, Ark., passed the following ordinance: "Whereas, the municipal board of health of Helena, Ark., at a regular meeting, held on the 30th day of April, 1880, declared the sale of fresh pork detrimental to the health of the citizens of Helena; therefore, be it ordained by the mayor and council of the city of Helena: Section 1. That it shall not be lawful for any person or persons to sell, or offer to sell, within the city any fresh pork, or sausage made thereof, between the first day of June and October in each year," etc. Was this ordinance valid? The statutes of that State confer upon cities of the first class power "to prevent or regulate the carrying on of any trade, business or vocation of a tendency dangerous to morals, health or safety, or calculated to promote dishonesty or crime." Under this statute the city council of Helena undertook to prevent the sale of fresh pork "between the first day of June and October in each year." It obviously intended to prevent the eating of it in Helena during this time by prohibiting the sale of it. Again, the question: Was the ordinance passed for that purpose a reasonable or lawful exercise of the powers granted by the statute? The supreme court of Arkansas says, in its answer, Nov. 13, 1897, case of City of Helena vs. Dwyer, that fresh pork is an article of food of general consumption and, when sound and free from disease, is useful and nutritious. Like all other food, it may become unwholesome when eaten to excess. The quantity eaten, under ordinary circumstances, produces the sickness, when it proves unwholesome. Any food is calculated to produce that effect when eaten in the same manner. The mere sale of it is not detrimental to the public health. The fact that individuals may be made sick by it when imprudently eaten does not justify a city council in prohibiting the sale of it. For the same reason it could prohibit the sale of any or all other food. The most delicious food, that which is most liable to be eaten to excess, would be subject to interdiction. If it be conceded that the city council may prohibit the sale of any article of food, the wrongful use of which will or may injure the health of the consumer, then they can prescribe what the citizens of the city shall eat by prohibiting the sale of all other food. The legislature or any of its creatures has no such power. The exercise of such power would be a violation of the inalienable right of man to procure healthy and nutritious food, by which life may be preserved and enjoyed. It would be an interference with the liberty of the citizen which is not necessary for the protection of others or the public health; would be an invasion of his personal rights. For the reasons indicated, the supreme court holds that the ordinance in question was unreasonable, invalid and void.

BOOK NOTICES.

Elements of Latin. For Students of Medicine and Pharmacy. By GEORGE D. CROTHERS, A.M., M.D., Teacher of Latin and Greek in the St. Joseph (Mo.) High School; formerly Professor of Latin and Greek in the University of Omaha; and HIRAM H. BICE, A.M., Instructor in Latin and Greek in the Boys' High School of New York City. 5¼x7½ inches. Pp. xii-242. Flexible cloth, $1.25 net. The F. A. Davis Company, Publishers, 1914-16 Cherry Street, Philadelphia; 117 W. Forty-second Street, New York City; 9 Lakeside Building, 218-220 S. Clark Street, Chicago, Ill.

This is an elementary Latin book for the use of students in

pharmacy and medicine and is well adapted for such use. It is well arranged and the exercises chosen are such as to familiarize the student with the work with which he is to engage. The only criticism we make is that the authors have seen fit to adopt the English system of pronunciation, which we think a mistake, inasmuch as no country except England has agreed to give the English vowel sounds to Latin words, and the student who undertakes to use the English pronunciation of medical terms in foreign countries, except England, will find himself not understood and his knowledge unavailable.

We regret extremely that a book in all other respects so worthy of commendation should have this defect. It is imperatively necessary that medical students, so long as they go abroad, should not be additionally burdened or handicapped by having learned the Latin terms (also used in foreign countries) with an insular pronunciation that can only be understood by the islanders themselves or their descendants.

Twelfth Annual Report of the State Board of Health and Vital Statistics of the Commonwealth of Pennsylvania. Two volumes, cloth, pp. 1194. 1897.

Volume I contains reports and minutes; reports of standing committees; annual reports of county inspectors and of cities and boroughs, and reports on quarantine, disinfection, epidemics and special sources of disease. Volume II has to do with conferences and conventions and includes many papers of interest read at these various meetings. This volume also contains circulars and forms concerning regulation of matters in the province of the State Board of Health, etc.

The Psychology of Suggestion. A research into the subconscious nature of men and society, by Boris Sidis, M.A., Ph.D., with an introduction by Professor William James of Harvard University. New York: D. Appleton & Co. 1898.

Much of the experimental part of the work although planned by Dr. Sidis was done in the Harvard Psychologic Laboratory.

The volume is divided into three parts. Part 1, Suggestibility. Part 2, The self. Part 3, Society.

Those interested in elements and stages of self-consciousness, intercommunication between the two selves, will find very much of interest in this volume. Here we have the mental processes brought down by easy transitions into formation of geometric figures and algebraic equations.

"It is as easy as playing on this pipe." The work is however instructive to all interested in this latter day fad, whether they agree with the conclusions of Dr. Sidis or not.

Notes on Micro-organisms Pathogenic to Men. By the Surgeon Captain B. H. S. Leumann, I. M. S., London and Cambridge: Longmans, Green & Co., pp. 65. 1897.

This is one of the most instructive and interesting little works that has fallen under our observation. It contains more in fewer pages than any work on the subject in English. Each paragraph in his work has a marginal note index which for reference will be found very convenient.

It is based on lectures delivered at the Army Medical School at Netley during the winter session of 1893 and 1894.

Among recent small works on bacteriology this little one must take a prominent place.

The World's Almanac and Encyclopedia, 1898. Pp. 568, issued monthly by the Press Publishing Company. Pulitzer Building. New York.

This well known Almanac seems to have collected all the facts of the year and condensed them in a way to make them handy and useful. No almanac contains more information than this.

SOCIETY NEWS.

International Health Exposition.—An International Health Exposition is to be held in New York City, April 25 to May 31, 1898.

American Laryngological, Rhinological and Otological Society.—The Southern Section of the American Laryngological, Rhinological and Otological Society will meet in Atlanta, Ga., Monday March 28, at 10 A.M. in the parlors of the Aragon Hotel. An invitation is extended to the profession, and especially to members of the Society. Dr. A. W. Calhoun is Chairman and Dr. Dunbar Roy of Atlanta, is secretary.

Cumberland County (N. J.) Medical Society.—The January meeting of the Cumberland County Medical Society was held at "Hotel Stephens," Vineland, January 11, with Vice-President, Dr. Judson in the chair. Dr. Ware read an interesting paper on the "Old Time Doctor." A valuable paper on "Puerperal Eclampsia," was also read by Dr. L. F. Day.

The Denver and Arapahoe Medical Society.—At the annual meeting of the Denver and Arapahoe Medical Society held January 11, the following officers were elected for the ensuing year: President, E. P. Hershey; vice-president, H. B. Whitney; secretary, G. E. Tyler; financial secretary, J. M. Blaine; treasurer, E. J. Rothwell. There is great enthusiasm in the Society over the coming of the American Medical Association in June, and preparations are being made for the handsome entertainment of all delegates. Colorado will give them most hearty welcome.

NECROLOGY.

Theophilus Parvin, A.M., M.D., LL.D., ex-President of the American Medical Association, Professor of Obstetrics and Diseases of Women and Children, Jefferson Medical College, died January 29 after a short illness at his home in Philadelphia. About eight years ago, Dr. Parvin, when examining a patient, inoculated his index finger with specific poison and, recognizing the nature of the infection, he called the attention of the class to it on several occasions as a warning to them to be always on their guard. His health subsequently became impaired and he suffered with a severe form of chronic laryngitis which compelled him for a time to suspend his lectures; of recent years however, this affection had been overcome so that he not only resumed his course of lectures, but was able to accept complimentary invitations to address medical societies. He was also a prominent member of the Young Men's Christian Association, being especially interested in the evangelistic work among the colleges; he occasionally presided or delivered addresses on Sunday night religious meetings for students. About a month ago Dr. Parvin experienced attacks of difficulty of breathing and irregular heart action, and showed marked evidence of failing health, but it was not until the day before his death occurred that his attending physicians anticipated any serious result to his sickness. He leaves a widow and two sons.

Dr. Parvin was born in Buenos Ayres, Argentine Republic, Jan. 9, 1829, his father being at that time a missionary there. On the death of his father, when Dr. Parvin was only seven years of age, the son was sent to Philadelphia and prepared for college. He attended the freshman year in class of 1846, at Lafayette College, Easton, Pa., and then went to University of Indiana, where he was graduated in 1847. He then returned to Philadelphia and attended lectures at the Medical Department of the University of Pennsylvania, when he received his diploma in 1852. After spending two years as ship surgeon on a packet sailing between Philadelphia and Liverpool, Dr. Parvin went to Indianapolis, where he found a favorable location to practice his profession. In 1855 he accepted the chair of Materia Medica and Therapeutics in the Ohio Medical College at Cincinnati. Selecting the chosen field of labor in which he afterward became so distinguished as an author and teacher, he devoted especial attention to obstetrics and gynecology and entered the Faculty of the University of Louisville as Professor of Obstetrics, a position which he soon resigned in order to accept the same chair in the Indianapolis Medical College, which he helped to organize and establish. In 1872, Hanover College granted Prof. Parvin the

honorary title of Doctor of Laws. In 1883, Dr. Parvin was called to the chair of Obstetrics and Diseases of Women and Children in the Jefferson Medical College, a position which he most acceptably and successfully filled until his death.

The Obstetrical Society of Berlin made Dr. Parvin an honorary member and this distinguished compliment was also paid him by the Obstetrical and Gynecological Society of Edinburgh. He was a member of the International Medical Congress and attended the sessions at Washington, Berlin and Moscow. He was a Fellow of the College of Physicians and the Philosophical Society of Philadelphia, of the American Academy of Medicine and of the American Gynecological Society. He was elected one of the honorary presidents of the Obstetric Section of the Berlin International Medical Congress and of the International Congress of Gynecology and Obstetrics which met at Brussels. He was also a prominent member of a number of other medical societies both in this country and in Europe.

Dr. Parvin was a facile writer and lecturer, he had a pleasing frank expression of face and a clearness in expressing his thoughts which made him an attractive public speaker. Those members of the ASSOCIATION who were present at the meeting at Atlanta in 1879, when Dr. Parvin delivered his Address as President, will never forget the marked evidences of favor which were accorded him, and the enthusiasm that his words inspired in an audience not accustomed to demonstrations of the kind. Professor Parvin was a valued, though lately not a frequent contributor to medical journalism. He was a member of the Medical Editors Association and had served as its President. In 1886 he finished his work on the "Science and Art of Obstetrics," which has gone through a number of editions and is now used as a text book. He also translated Winckel's "Obstetrics" several years ago. He was one of the associate editors of "Sajous' Annual of the Universal Medical Sciences" and contributed important articles to several systemmatic treatises and encyclopedias of medicines and allied sciences.

The students of Jefferson College and the members of the Theophilus Parvin Medical Society passed resolutions of sympathy and condolence, and the Faculty of Jefferson College entered a minute recording their sense of loss to the community, to the College and to the world of science and letters by his death.

J. Q. A. STEWART, M.D., died January 25 at his home, Farmdale, near Frankfort, Ky., of Bright's disease. Dr. Stewart was born Feb. 13, 1829, near Louisville. At the age of 20 years he had secured a good common school education and had graduated in law. Before he had begun the practice of his profession the "gold fever" had broken out in California and he decided on the journey across the plains. Soon after their arrival in the mining camp he was chosen magistrate, and many were the interesting stories he has been able to tell his friends of his career as "Judge." After some years in California he returned to Kentucky. In 1859 he was graduated from the Kentucky School of Medicine and at once went to Daviess County to practice. As a practitioner he was successful from the start, and after a few years practice in the country he removed to Owensboro, where he lived, meeting with all the recognition, social and professional, offered by Owensboro, until his removal to Frankfort, in March, 1878, to accept the position of medical superintendent of the Kentucky Institution for the Training of Feeble minded Children, tendered him by Gov. John B. McCreary. It is rare in this day of practical politics that a governor in rewarding party friends, makes so fortunate a selection as was made in this instance by Governor McCreary. That his appointee measured up to the place in every way is evidenced by the prompt reappointment by Governors Blackburn, Knott and Buckner. He honored the position, and the sixteen years he passed in this institution were marked by a fidelity to duty, interest in his work, and an ability to carry it on never excelled in the history of our eleemosynary institutions. To show the esteem in which he was held by the parents of the children intrusted to his care, every one who could afford it removed their afflicted ones to Dr. Stewart's private infirmary, when his term as superintendent of the State Institution was ended. Whilst he would undoubtedly have met with a large measure of success in private practice, it is questionable if he could ever in a large city have done the amount of good that he now has to his account. In the spring of 1893, his only son having graduated in medicine, Dr. Stewart bought the old Kentucky Military Institute, six miles from Frankfort, and established him in business as manager of the "Stewart Home." In the following year, upon the expiration of his term at the State Institution, Dr. Stewart resigned to be associated with his son in the management of their private infirmary. As an alienist Dr. Stewart is well known all over the continent and Europe. He has visited every public and private institution in the country, and did not, for many years, miss a single meeting of the superintendents. He was an ex-president of their association and contributed valuable papers at their different meetings. In the industrial reforms of feeble-minded institutions, he was the pioneer in inaugurating the teaching of useful trades to the brighter patients; gardening, carpentering, shoemaking, broom and mattress making to the boys, and sewing, washing, cooking and housework to the girls. The highest honor the profession of a State can show a fellow is an election to the presidency of the State Medical Society, and this was generously accorded Dr. Stewart at the Frankfort meeting in 1893.

BENJAMIN CHAMBERS LUDLOW, M.D., University of Pennsylvania, 1854, died at his home in Los Angeles, Cal., January 10. He was born in 1831 at Ludlow Station, Ohio, and when 30 years of age raised a company of cavalry whose services were offered to Lieut. General Scott at the opening of the civil war. The latter replied: "No cavalry will be required. The four regular regiments will be sufficient." Soon after he was made captain of Fremont's Hussars at St. Louis, Mo.; then an aide of Major General "Joe" Hooker at the battle of Chancellorsville, and served under Major General Meade as an inspector of artillery at Gettysburg, Williamstown, Wine Run, Rappahannock and in several minor battles. In October, 1864, Col. Ludlow was appointed Brigadier General, by brevet, for gallant conduct at Dutch Gap and at Spring Hill, Va., and was placed in command of the James and York river defences. He resigned from the army in 1865.

DEATHS IN THE PROFESSION ABROAD.—Jules Emile Péan, Paris, January 30. He was born at Chateau Dun (Eure-Et-Loire), Nov. 29, 1830, and practiced surgery continuously in Paris for more than forty-five years. He was easily at the head of modern French surgery, and in the whole surgical world it is doubtful if he had a superior as an all-round surgeon. In 1865 he was appointed surgeon of the central bureau. Two years later he joined the staff of the Lourcine, where he remained five years, going then to Saint-Antoine, and finally to Saint-Louis, where he remained until 1892. He became famous for his success in the delicate operations of ovariotomy. In 1887 he was elected a member of the Academy of Medicine. Three years later he received the decoration of the Legion of Honor, and in 1893 he was made a commander. His many admirers in America will greatly regret to learn of his death, and will join the medical profession of his native country in mourning his loss, for Péan belonged not only to France, but to the world.——Dr. Stanislaus Danillo, lecturer on Mental Diseases in the St. Petersburg Medico-Military Academy, aged 49 years.—— Dr. Carl Ritter von Rzehaczek, Emeritus Professor of Surgery in the University of Graz.——Dr. Tiburcio Padilla, founder and till his death editor of the *Samana Medica*, of Buenos Ayres; professor in the Colegio Nacional; physician to the Hospital de las Mercedes of that city; author of "*Guia Medical*" and a work on medical jurisprudence; co-editor of the "*Farmacopea Argentina*," etc.——Dr. T. H Belval of Brussels, editor of the *Mouvement Hygiénique*, and founder of the Belgium Anti-alcohol League, aged 65 years.

W. ABRAM LOVE, M.D., Atlanta, Ga., died January 21, aged 74 years. Dr. Love was born in Camden, S. C., was graduated from the medical department of the University of Pennsylvania in 1846, and was elected superintendent of the Georgia Asylum for the Deaf and Dumb in 1850. In 1871 he was elected to the chair of physiology in Atlanta Medical College, and later president of the faculty, which office he held on his death. He was also a member of the State Medical Association and the AMERICAN MEDICAL ASSOCIATION.

CHARLES L. WELLS, M.D., Professor of Diseases of Children, University of Minnesota, Minneapolis, died January 20, from pneumonia. Dr. Wells was born in Pompeii, N. Y., 56 years ago; was graduated from Geneva Medical College in 1869, and ex-president of the Minnesota Academy of Medicine.

SMITH BUTTERMORE, M.D., Connellsville, Pa., Dec. 28, 1897, aged 68 years.——Joseph R. Chaffers, M. D., Worcester, Mass., January 19, aged 40 years——John C. Corley, M.D., Bloomington, Ill., January 27.——Charles Gangloff, M.D., Pittsburg, Pa., January 22, aged 51 years.——W. L. Hallam, M.D., Bloomington, Ill., January 24, aged 45 years.——Frank A. Mitchell, M.D., Bridgton, Maine, January 23.——R. C. Rice, M.D., Smithland, Iowa, January 25, aged 60 years.——Chas. Slaughter, M.D., Duluth, Minn., January 23.——Shep. A. Rogers, MD., Memphis, Tenn.

MISCELLANY.

Coxitis Tuberculosa.—F. König considers a radiograph an indispensable preliminary to operation, although simple granulating foci cast no specific shadow. But degenerated bones, especially caseous infiltrations, are shown well in the photograph, except in the case of very young children.—*Klin. Therap. Woch.*, January 1.

Tuberculosis of the Tubes.—Jacobs recently operated on a young woman to remove an enormous abscess of the left tube, which proved to be tuberculous, and later the right tube had to be removed for the same cause. There are no other manifestations of tuberculosis, and the patient seems now in the best of health.—*Presse Méd.*, January 1.

Tuberculin R.—The latest reports published continue to be unfavorable to Koch's new tuberculin; the disease seems to continue its course unaffected by the injections (Stempel, 23 cases; Spiegel, 21 cases, *Münch. Med. Woch.*, Nos. 48 and 50, 1897). The greatest benefit has been derived from it in lupus, and here and there are a few who endorse it enthusiastically. In closing the series of articles the *Deutsche Med. Woch.* has been publishing on the subject, it remarks that several years must pass before the value of the Koch treatment is finally established.

Differentiation of Tuberculosis of the Salivary Glands.—Frequently produced experimentally, this localization of tuberculosis in man is extremely rare. O'Zoux describes two cases, distinguished from simple adenitis by the large size of the tumor and its location close beneath the edge of the lower maxillary bone. It is very painful and less solid around the edges than an adenitis. The pus is thin and not very abundant. The sound everywhere meets the same resistant, squeaking tissue. —*Archives Clin. de Bordeaux*, 1897, No. 1.

Pancreatic Diabetes of Tubercular Origin.—Carnot states that specific tubercular lesions are very rarely found in the pancreas, which reacts to tuberculous infection with sclerosis, caused evidently by the products of the bacillus, as the bacillus itself disappears very rapidly. Experimentation with dogs produced a similar sclerosis reaction, with or without glycosuria, according to the progress of the sclerosis in most cases. When there was no trace of glycosuria, the necropsy usually showed part of the organ still intact or regenerated. When the sclerosis in man becomes total diabetes follows.—*Gaz. d. Osp. e d. Clin.*, January 4.

Lupus and Tuberculous Ulcerations of the Ano-rectal Region.—A recent thesis by Dimitroff observes that this affection is not so rare as supposed; one has only to look for it. The infection is sometimes from without; accidental contact with infected clothing, etc.; sometimes from tuberculous sputa, possibly of auto-origin. The development of the bacilli is favored by hemorrhoids, constipation or diarrhea, traumatism, etc. He adds another to the seven observations on record. A comparatively healthy young man, affected for two years with tuberculous erythematous patches and ulcerations, which were excised and the loss of substance substituted by a flap from the surrounding region. The result was excellent, and excision is recommended whenever the lesions are too deep to be removed by scarifying alone.—*Presse Méd.*, January 15.

A New Streptobacillary Tuberculosis.—Courmont and Tixier have succeeded in isolating and cultivating a special streptobacillus from a peculiar form of tuberculosis consisting of a hemorrhagic arthritis of the elbow with typic tuberculous manifestations, nodules, giant cells, etc. It was impossible to find the Koch bacillus, but animals inoculated with the serous fluid from the joint succumbed with extreme rapidity to tuberculosis, resembling in some respects the human lesions. In the tubercles on the liver of one of the guinea pigs that had succumbed, a streptobacillus was discovered which cultivated easily on various media, and was reinoculable, producing the specific infection, distinguished by the rapid invasion of the ganglia, the local suppurations in some cases, and frequent hemorrhagic lesions.—*Gaz. d. Osp. e d. Clin.*, January 6.

The Painful Dysphagia of Tuberculous Laryngitis.—It is important to relieve this condition as it interferes with nutrition, and Courtade has found the insufflation of morphin hydrochlorate, 0.2 to 1 centigram, mixed with sugar of milk, the best analgesic for the purpose. The tip of the tube is placed at the entrance of the larynx, and while the patient makes the sound of a prolonged *ah*, he squeezes the bulb and the powder is evenly distributed. Repeat twice a day. Sprays will sometimes relieve better. He uses a solution of phenic acid, 1 gram; glycerin, 20 grams; water, 300 grams; cocain hydrochlorate, 50 centigrams. The spray is inhaled deeply by the mouth, with expiration through the nose. Local applications are also useful in some cases, of a twentieth solution of resorcin or chlorid of zinc, with or without morphin. He warns against the use of counter-irritants.—*Gaz. d. Osp. e d. Clin.*, January 13.

Tuberculous Pleuritis.—In a recent lecture reported in the *Gaz. d. Osp. e d. Clin.* of January 9, Professor Maragliano remarked that in forming a prognosis of this affection we must banish from our minds the old idea that tuberculous affections were necessarily fatal. Tuberculous pleuritis frequently terminates in spontaneous recovery, especially when the effusion is serofibrinous, but if the effusion does not show a tendency to be absorbed, thoracentesis should be performed, and the ribs resected if necessary. This latter, he adds, is still a problem for the future, as at present surgical intervention is reserved for desperate cases; but, if instead, we strove to prevent the development of an affection by surgical intervention in the initial stages, he believes that this therapeutic conception would demonstrate its utility and be crowned with success in practice, especially in these cases, when the lungs are compressed by the effusion, and fibrous stratification and pseudo-membranous adherences prevent absorbtion.

Transformation of Human Tuberculosis by Passage Through Cold-blooded Animals.—Intraperitoneal inoculation of dead or living human tuberculosis in fishes, snakes, lizards, turtles and frogs, produced violent phagocytosis reaction, ascitic effusion, false membranes, adherences between the viscera and typic tuberculous granulations. The dead bacilli retained their shape and reaction to stains more than four weeks. The living bacilli adapt themselves to their new environment by the twelfth day, becoming club-shaped, ovoid, dichotomous, etc., showing involution. Some spored; others sent out lateral buds. Far from losing their vitality, these bacilli cultivated readily, producing these transitional forms of Velars' bacillus. Injected into guinea pigs, these transformed cultures produced a much-

attenuated tuberculosis or a local lesion or no reaction, according to the number of passages and the degree of transformation. Lizards resisted the inoculations of human tuberculosis and also proved refractory to Velars' bacillus, bac. tuberc. piscium.—Dubard of Dijon, *Bull. de l'Acad. de Méd.*, December 7.

The Audiffred Prize for the Cure of Tuberculosis, Acad. de Méd. Paris, was not awarded this year. Over a hundred communications were received, mostly from non-medical persons, who announce that on receipt of the prize, they will impart the particulars of an infallible remedy. One contained a poem celebrating the golden wedding of the writer, who had married a tuberculous girl fifty years before, and cured her with his remedy. The only two strictly scientific communications were from America. One from Hirschfelder of San Francisco, who described his success with oxytuberculin (*vide* JOURNAL, Vol. XXIX, p. 208), and the other from Vergara Lope and Herrera of Mexico, reporting the successful results of their treatment of tuberculosis with artificially rarefied air (*vide* JOURNAL, Vol. XXVII, p. 656). Both are interesting, but the Académie does not consider them sufficiently established by experimentation with animals to entitle them to the prize.

Mercury in Tuberculosis.—Dr. Dubois reported to the Paris Académie de Médecine a year ago (*Bulletin*, Feb. 2, 1896), that he had secured results surpassing all expectation, in tuberculosis, with a thousandth solution of the bichlorid of mercury, 0.5 c.c. injected every other day in the subspinal or subclavicular region, increasing to 1 c.c. At first he thought he must have stumbled on syphilitics, but he soon became convinced that this was not the case. He has been using this treatment for five years, and has succeeded, even in advanced cases, in attenuating the night sweats, arresting hemoptysis, and curing the digestive disturbances, but his most remarkable successes were obtained in the earlier stages. He described twenty cases in detail. Tentative treatment in this line has already been made by Rush, Watson, McDowell, Ham and others, and more recently by Miquel and Rueff with mercuric iodid sprays and Grande with sublimate and methylene blue.

Waning Popularity of Koch's Tuberculin.—As to Koch's new tuberculin, the editors of the *Deutsche Medicinische Wochenschrift*, after having devoted considerable space to papers upon the subject, have now resolved to close their columns for a time to its further consideration. It will take years to really decide the therapeutic value of the new serum, and discussion at present can only be illusory, the personal feelings of the observer too greatly influencing his judgment as to results. The use of the old tuberculin for diagnostic purposes seems to be thoroughly disapproved of here in the clinics for internal medicine. The reaction which occurs after the injection of tuberculin when tubercle bacilli are present is considered to be due to a necrosis of tissue around the bacilli and the absorption of toxic products therefrom. Such a septic reaction can not be without danger, and necrosis of tissue may cause the further absorption of bacilli into the lymph or blood vessels and so institute an acute process. As the majority of people have encapsulated bacilli in the apices of the lung or somewhere in the bronchial glands without being in the slightest sense tuberculous, the recurrence of the reaction can not be said to be definitely diagnostic of active tuberculosis. In cases where the bacilli have been completely shut off from the possibility of doing any harm by Nature's protective barriers of inflammatory lymph, there is danger that the quiescent condition may become active under the influence of the injected toxins. The injections are practically considered unjustifiable, except in the determination of the etiology of such serious affections as pleurisy or ascites where the patient's dangerous condition makes an experimental diagnosis with tuberculin less risky.—*Medical News*, October 23.

Products of the Tubercle Bacillus and Serum Therapy.—A. E. de Schweinitz and Marion Dorset have succeeded in isolating the special substance contained in or secreted by the Koch bacillus which causes the necrosis apparently necessary for the progress of the tuberculous infection. It is a definite, crystalline, soluble substance with the chemic formula $C_7H_{10}O_4$, which coincides with an incomplete acid of the fatty series, teraconic acid. This substance is found constantly in the culture-fluid, but the bodies of the bacilli only contain traces of it. It produces chills, hypothermia and dyspnea in sound and tuberculous guinea pigs. Injected directly into the liver it produces necrotic foci. After filtering the cultures, the bacilli were washed in cold water, and a hot aqueous extract then made. This extract contained an albuminoid which produced several times in succession the tuberculin reaction experimentally. Koch's first tuberculin ceased to produce any reaction after one or two injections, because it contained the necrosing, hypothermising principle described above, while the albuminoid extracted from the bodies of the bacilli produces the opposite effect. These two principles which seem very active, were both obtained from attenuated cultures. The writers have also succeeded in obtaining experimental immunization (horses) and, by the Brieger Boer method, have secured a grayish powder as a precipitate of the serum of the immunized animals, giving the biuret reaction, which they consider the specific antitoxin, as it produces exactly the same immunizing effects as the serum. Their experiments encourage the belief that as serotherapy becomes perfected we can hope for the day when it will be practicable to apply it to man.—*Presse Méd.*, January 12, from the *Cbl. f. Bact.*, 1897, No. 8.

The Diagnostic Value of Koch's Tuberculin.—Time has elapsed sufficient to allow a quite accurate estimate of the value of Koch's discovery, in its immediate practical bearing upon medical art. No one can deny that, beyond this valuation, there is a reasonable expectancy of great good to be developed later on the lines laid down by Koch, and especially with regard to other diseases than tuberculosis. In fact, the value of diphtheria antitoxin, which is, in a general sense, to be classed with Koch's products from the activity of tubercle bacilli, is almost beyond dispute. Therapeutically it may be said that the tuberculins from time to time offered, have not justified the claims of their originators, although there is some support for the argument that benefit has occurred in incipient cases. However, it must be remembered that the average patient with incipient tuberculosis, either so-called from clinical observation or well established, has a fair chance of recovery from purely hygienic measures, if he can fight for his life without handicap. Diagnostically, the tuberculin test has been of untold value in veterinary practice, by enabling the early detection of tuberculous sources of milk and beef. The almost unanimous testimony of veterinarians and others who have had experience with this use of tuberculin, is that it is practically infallible. There is a considerable prejudice against the use of tuberculin as a diagnostic measure for human beings. This prejudice is found even among those who had the most glowing hopes of the benefits of tuberculin, though it may, in some degree, represent a reaction due to the disappointment in regard to therapeutic results. Many believe that the use of tuberculin may so depress a patient who is in a weak but not positively tubercular state, that they prefer to leave the decision to the further progress of the case, meanwhile giving the patient the benefit of the doubt by taking all possible precautions against the growth of a tubercular process. Maragliano gives an adverse criticism of Koch's new tuberculin, disputing both the claim that the new product contains active substances not obtainable by the former method of solution with glycerin, and that it is innocuous. Maragliano states that the apparent immunity from bad side-effects is merely due to diminished dosage. How-

ever. Maragliano makes an assertion which may be the germ of an important truth, that it is not necessary to obtain a marked reaction with tuberculin, but that we should use a dose below that required to produce conspicuous phenomena. This is certainly in line with general experience as to medical agents, that the early doses though producing picturesque effects are dangerously large and therapeutically inferior to those which have no obvious immediate result. A recent experimenter has found that some serums or bacillary extracts are not free from living bacteria, and that they are thus a positive source of danger, while others are inert. It is to be deplored that the history of such products is blotted at frequent intervals with the manifestations of a mercenary and commercial spirit, which has extended even to members of the medical profession. Meantime we must admit that the chapter is unfinished, that much is to be hoped for from the labors of numerous scientific investigators at home and abroad, and that what has already been accomplished is of a value which seems small only in the light of the hopes of a revolution in medical practice. It seems to us that one item must be considered in weighing the probable results of combatting tuberculosis with artificial products from its bacilli. The corresponding natural products have no action to prevent a second attack, or to limit the existing attack of tubercular disease; in fact, they decidedly favor the development of further tubercular trouble.—*American Therapist.*

Toxicity of Caseous Patches.—Rosa has been investigating the toxicity of caseous tuberculous patches in man, with which he has inoculated thirty rabbits. The results were negative in every instance. The organism therefore has the dual power of killing the bacilli of tuberculosis and of attenuating or destroying the toxic products originating in the bodies of the dead bacilli.—(Italian Cong. of Surgery. *Gaz. d. Osp. e d. Clin.*, November 14.)

New Publications.—The following new monthly journals are quoted among our exchanges: *Hospital Life*, Chicago, devoted to the interests of hospitals, etc.; *Journal of Applied Microscopy*, Rochester, N. Y.; *The North American Journal of Diagnosis and Practice*, St. Louis; *The Wisconsin Medical Recorder*, Janesville, Wis. The subscription price for either of these is $1 per year.

A General Denial.—The *Medical News* has its little story about drug-giving that has the flavor of one of Dr. Oliver Wendell Holmes' sayings. It runs as follows: "Once upon a time when General Sherman was ailing and under the care of a medical friend of ours for quite a long time, he said, 'Doctor, I do not seem to be getting any better for all your medicines.' 'Well, General,' was the reply, 'perhaps you had better take Macbeth's advice and throw physic to the dogs.' 'I would like to do so, Doctor, but there are a number of valuable dogs in this neighborhood.'"

Three Thousand Dollars for a Sprained Ankle.—At first thought, the supreme court of Minnesota says, it would seem that $3,000 for what counsel called "a sprained ankle" was much too large. But it believes that "sprains" may often be much more serious than broken bones, and it holds that the evidence in the recent case of Christian v. the City of Minneapolis justified a verdict of $3,000 for the so-called "sprained ankle," and that the damages awarded were not so excessive that it would be warranted in disturbing the verdict.

Effect of the Aldehydes and Ketones on Micro-organisms.—Tschugaew states the following conclusions as the results of extensive tests on sixteen varieties of micro-organisms: The toxicity depends upon the aldehydes and diminishes with their increasing molecular weight, and still more when hydroxyl is combined with the aldehyde molecule. On the other hand, if phenyl is combined with the molecule the toxicity is increased, as is also the case with chlorin and bromin.—*St. Petersb. Med. Woch.*, October 30.

Radiography.—Kelsch found in examination of 124 young persons, none with clinical symptoms of pulmonary lesions, that fifty-one were affected with slight abnormalities, decreased transparency of bronchial adenopathy. He suggests fluoroscopy as a valuable aid in determining the pathologic future of the young. Its importance is evident in eliminating young men with a predisposition to tuberculosis in examining for military service. . . . . Vaillant places a sheet of lead between the sensitive plate and its support in radiography of the plevis, which reduces the time of exposure one-half and renders the negative much more distinct.—*Bull. de l'Acad. des Méd.*, December 21.

Transplantation of Bones from a Dog.—In 1891 Dubar removed five of the small carpal bones from a ten year old girl with tuberculosis of the right wrist, curetting the ends of the bones of the fore arm and metacarpus, and substituting five pieces taken from the lower end of the femur of an eight day-old dog freshly killed. The wound was sutured and drained; it healed rapidly and perfectly. He never expected to see those bones again, but when he met the patient recently he had a radiograph taken of the wrist, which showed the implanted bones, exactly as first placed, connected by new connective tissue, a third larger in size, and grown into the metacarpal. The joint is movable, painless, and no inconvenience is experienced in sewing or knitting. The favorable results secured should encourage others to follow the same plan.—*Bull. de l'Acad. de Méd., Deu. Med. Woch.*, December 23.

Experimental Immunization with the Cellular Extracts of Bacteria.—Further experimentation is reported with Büchner's process of mechanical trituration of bacteria with granite sand, compressing the mixture under high pressure, and obtaining thus the cellular extract, the plasmin of the microbes. Positive results were secured with cholera and typhus plasmin. Guinea pigs injected presented the same lesions as if they had received intraperitoneal injections of the living bacilli, and with repeated doses were rendered immune to infection from a ten-fold fatal dose. The results were negative with staphylo- and anthrax plasmin. Of the seventeen guinea pigs injected with tuberculosis plasmin, five are still living. The rest succumbed, although not until long after the control animals. It was found innocuous administered to tuberculous individuals, but the doses were necessarily too small to accomplish the results obtained experimentally.—*Presse Méd.*, December 11, from *Muench Med. Woch.* of Nov. 30, 1897.

Special Delusions as Defenses.—If the defendent had certain special delusions which completely possessed him, but was perfectly sane on all other subjects, as was contended in the case of People vs. Hubert, then he must, the supreme court of California holds, December, 1897, be judged as though the facts with respect to which the delusions existed were real. Of course, if no partial insanity existed, intimate acquaintances could know nothing of it, and the fact that they did not would be some proof that the defendant had no such delusions, which, the court holds, would render evidence of that character admissible. But matters of science, such as the pathology of mental diseases, the court declares, are always to be proven, and are treated as matters of fact, with regard to which the trial court should not instruct the jury. The fact that these matters are discussed in legal treatises or judicial opinions, it adds, does not convert them into propositions of law, though in some other jurisdictions there is not the same objection to such instructions. The supreme court further maintains that it must be held that conceding that the act was the offspring of an irresistible impulse, and the impulse was irresistible because of mental disease, still the defendant must be held responsible if he at the time had the requisite knowledge as to the nature and quality of the act, and of its wrongfulness. It declares it an impracticable rule which would leave it to the

jury to say whether the act was the offspring of insanity; meaning, whether the defendant would have committed the act had he not been insane. It says that there are many degrees in mental unsoundness, and, however slight the defect, only Omniscience can say whether the act would have been committed had the taint not existed.

The Coin Rolls of the Baron's Blood.—Not long ago one of the distinguished clinical professors was summoned to the house of the Austrian member of the famous banking family of Rothschild. He was accompanied by a younger member of the profession who, while his chief was making the general clinical examination, proceeded to examine the baron's blood. The banker was extremely interested in the procedure, and when the examination was concluded asked what he had found. The assistant replied that he had found everything perfectly normal and healthy; that there was the usual number of red blood corpuscles, showing no marked differences in size or shape, and there was a very normal tendency to the formation of rouleaux. The distinguished patient, who is well acquainted with the hereditary failing of his family in the matter of successfully forming money rouleaux, but who did not realize that this tendency was so outspoken that it could be discovered on microscopic examination of his blood, was very much amused. He was at first inclined to consider the expression as not quite serious, and as meant to stave off questions on the part of an inquisitive patient. When assured, however, that the description was eminently scientific, his admiration for the "new medicine" was correspondingly increased. "What is bred in the bone, will out in the blood" I suppose received a striking exemplification for him. When the visit was over and the doctors were leaving, the fee the younger man found in the envelope handed him by the baron's secretary was not smaller for his chance excursion all unwitting into the atavistic peculiarities of the Rothschild family in his perfectly commonplace description of the results of a blood examination.—*Medical News.*

Therapeutic Ferments and "Local Diabetes."—"Animal life is fermentation. Normal fermentation is health; abnormal is disease. . . . It is possible to substitute a healthy fermentation for a morbid." Proceeding from these premises Backer, Charlier and Bruhat have been applying the typic ferment, *saccharomyces cerevisiæ*, to the treatment of tuberculosis and cancer since 1892, and reported at the Moscow Congress that they have obtained many cures or remarkable improvement in both diseases, selecting severe cases for the tests. The ferment is injected subcutaneously in small doses, and during treatment the diet is extremely rich in glycogenic substances and starches. Sixty cancerous tumors thus treated have resulted in eighteen cured for several years. In one case of multiple tumor formation the disease was arrested for ten months. In tuberculosis, 75 per cent. were cured, or notably improved, half of them cases hitherto supposed fatal. Backer stated five years ago that a probable explanation of the sterility of some women was a lack of glycogenic elements in their uterus, which seems to be confirmed by Brault's announcemant that the glycogenesis in a neoplasm is in exact proportion to the rapidity of its development (*vide* JOURNAL, Vol. 28, page 1093). Backer has also noted the fact that the glycogenic organs are the chosen seat of neoplasms and calls cancer "local diabetes." The subcutaneous injection of pure ferments transforms the glycogenic substances into alcohol and its subproducts, which he believes have a neutralizing power in the nascent state.—*Journal d'Hygiène*, October 21.

Suprarenal Extract in Menacing Death from Chloroform.—Dogs were chloroformed until the circulation and respiration ceased, and then in thirty seconds injected with 1 to 2 grams of a 1 per cent. suprarenal extract, in the vena jugularis, restoring them to life. Intravenous injections were found the most effective. The powerful effects obtained even with these small amounts prove that the substance is not innocuous and should be limited to small doses. Mankowski therefore recommends that freshly prepared, sterilized, suprarenal extract should be at hand at every chloroform narcosis, to use promptly in case of menacing danger, adding that the best results are attained by combining the intravenous injection of the extract with simultaneous massage of the heart and subcutaneous infusion of salt solution.—*St. Petersb. Med. Woch.*, October 30.

Overworked Pharmacists in New York.—A bill in the New York legislature has for its object a shortening of the hours of labor of druggists' assistants. The bill provides that no pharmacist, drug clerk or other employe in a drug store in the city of New York shall work more than ten hours a day on week days, excepting Saturdays, when the time shall be twelve hours. On Sundays and legal holidays the time shall be six hours. All such employes are prohibited from sleeping in any store, room or laboratory where drugs are stored or compounded, the Board of Health is to enact rules and regulations governing the enforcement of the law. The bill has been prepared at the request of some of the druggists and drug clerks in the borough of Manhattan. So far as is known there has been no action in other localities among either the druggists or their clerks. The bill as it was introduced is not so radical as it was at first intended that it should be. Some of the Manhattan drug clerks wanted a bill presented that would make necessary the closing of drug stores at certain hours of the day as well as on Sundays. This bill was thought to be too drastic, and the measure as introduced is a compromise.

Gleanings.—Dysentery successfully treated with three rectal injections of antipyrin a day, 5 grams to 250 grams water, retained fifteen minutes. *Semaine Méd.*, October 27.——Fresh air cure successfully applied to various protracted and subacute infections of childhood, hereditary syphilis, whooping cough, chronic gastro-intestinal affections, etc. *Therapeut. Woch.*, November 14.——Bruns' airol paste found extremely beneficial in ophthalmology, substituting linim. exsicc. Pick, for the mucilage. *Vide* JOURNAL, Vol. xxix, page 34.——Examination of the anus facilitated by inserting the finger in the vagina, the patient in the decub. dorsal. with pelvis elevated. ——The blood of diabetics decolorizes methylene blue solution even after all traces of sugar has disappeared from the urine. 20 cm. blood to 1 c.c. methylene blue, 1 to 6,000 solution. *Deutsche Med. Woch.*, November 25.——The lypolisis in mixtures of blood and chyle through which air has been conducted for twenty-four hours, results in the production of a diffusible substance that dissolves in water, the nature of which is still undetermined. *Ibid.*——Systematic alimentation with collagenous substances supplementing a good general diet found effective in promoting healthy growth of hair-covered surfaces. Suggested also as beneficial in arteriosclerosis. *Gaz. Med. Liége*, November 25.——Fourth case on record of diphtheroid syphilis simulating true croup. Cured with specific antisyphilitic treatment. *Journ. des Sc. Méd. de Lille*, November 20. ——Prompt cure of eczematous external otitis with ten-minute baths of warm 0.5 per cent. solution of sodium fluorid.——Kühnau announces the negative results of the examination of 169 patients to determine the clinical and diagnostic value of bacteriologic investigation of the blood. *Ztschrft. f. Hyg. u. Inf.*, No. 3——Remarkable success of ichthyol in two cases of chyluria; one, hematochyluria filariensis. One-half to two grams a day in pills. *Therap. Woch.*, December 12.

The Library of the Chicago College of Physicians and Surgeons.—This library was begun in a serious way in August, 1895, when a trained librarian was engaged, and the books belonging to the library were classified, accessioned and catalogued. The Dewey decimal classification was used and has proved adequate for this small collection. The library has grown by donations from the friends of the college, and a few small purchases,

until now it numbers 1,752 bound volumes. In addition to these, unbound volumes and reprints bound in pamphlet cases fill shelf room enough to hold 2,500 bound volumes. The accessions during the year have not been large: 292 bound volumes and about 2,000 journals. Twenty-seven medical journals are received regularly. The bound literature is carefully indexed by author and subject, part of it analytically. There are about 4,000 cards in the catalogue. The average number of students using the library each day has increased from twenty-six during 1896, to forty a day during 1897. Several classes do library investigation. At present the text-books and medical journals are the most used. The more recent books are put on reference shelves and are always accessible to the students for comparison and reference. The librarian will promptly acknowledge the receipt of any donations which the friends of the college are willing to give. Reprints are especially desirable, each one being treated in the catalogue as a book. The librarian is especially anxious to secure the following serials: *American Journal of Medical Sciences*, Vols. 1–22 inclusive, and years 1893 to date; *Annals of Surgery*, Vols. 1, 2 and years 1893 to date; *Boston Medical and Surgical Journal; Edinburgh Medical Journal*, 1828 to date; *Lancet* (London) 1835 to date; *New York Medical Journal*, Vols. 1–47, 56–59, 61–2; *New York Medical Record; Therapeutic Gazette*, Vols. 1–3. Although these are needed to help complete one department of the library, any medical literature is acceptable. The library has a large number of valuable duplicates which are for exchange with other libraries or private individuals, a list of which can be obtained on application at the library. The library room has recently been decorated with some very fine photographs of medical men.

Address, THE LIBRARIAN, College of Physicians and Surgeons, 813 W. Harrison St., Chicago.

Louisville.

PHYSICIANS' RIGHT OF WAY.—An ordinance has been passed by the Common Council and is now in effect in Louisville, regulating the rights of way and permits therefor. Section 1 concerns the right of way of ambulances over any other conveyance, etc., while engaged in going for or conveying any sick and wounded. Section 2 concerns the wearing of physician's badge and the right of way granted such badge. Section 3 has to do with the issuance of permits to practice medicine. Section 4 requires the health officers to obtain a certified list of physicians licensed by the State Board of Health and practicing in Louisville, etc. Section 5 prohibits greater delay than five minutes to ambulances, etc., at railroad crossings, etc. Section 6 provides penalties for offenses against the ordinance.

STATE MEDICAL COLLEGE.—The Hon. J. H. Lackey of Trigg County has introduced a bill into the Legislature which provides for a free medical college in connection with the State Agricultural and Mechanical College at Lexington, Ky. The author of the bill contends that many young men are deterred from taking a course in medicine because of the fees, that there are free schools for nearly all trades, arts, sciences and professions except that of medicine, and that the conditions are favorable at present, without extra expense in regard to the buildings, to establish a medical school in connection with the above College. The bill states that as there is already taught in the College the following branches, chemistry, anatomy, physiology, botany, zoology, histology and microscopy, there would only be required the addition of surgery, theory and practice of medicine, materia medica, obstetrics and demonstrative anatomy. It provides for the establishment of the additional branches and that the course of study leading to the degree of M.D. be provided for as one of the courses of the College, and that a sum of money not to exceed $10,000 be appropriated for the purpose. Under its provisions each county in the State is entitled to place and maintain as matriculates in the school, two properly prepared young men or women, free of charge for fees during the time necessary to complete the course of study required. Appointments are to be made upon competitive examination by the board of health of the respective counties. Examinations shall cover the requirements for entering the freshman class of the College. Appointments shall be open to both sexes and the examinations held at a convenient place in each county at a date not later than September 15 of each year. The Faculty of the College shall be elected by the State Board of Health, subject to the approval of the Trustees of the Agricultural and Mechanical College, who shall have control of the management of the medical school. No professor shall be removed without the consent of the State Board of Health. It is provided that the $10,000 shall be paid the Treasurer of the Agricultural and Mechanical College upon the passage of the bill, and used by the Board of Trustees to establish and maintain a high grade medical college. Immediate steps are to be taken to have the medical department ready for the reception of pupils by Oct. 1, 1898. Provision is made for the occupancy of any unused buildings or rooms at the College as at present, and for the building of additional buildings as the growth of the medical department will warrant.

ABORTION.—In the Senate, Mr. Petrie of Todd County introduced a bill to prevent criminal abortion and to punish those guilty of this offense. This bill is introduced as a result of vigorous work on the part of the Kentucky State Medical Society, through a special committee appointed for that purpose, and through the State Board of Health, by its able secretary, Dr. J. N. McCormack. Under the present law it has never been possible to obtain a conviction because of technicalities, and prosecution can only be instituted in case of death of the mother. It is greatly to be hoped that this bill will pass.

MATHEWS.—Dr. Jos. M. Mathews is in Pittsburg this week as the guest of the local medical society, before which he delivered the annual address.

Detroit.

AT A REGULAR MEETING of the Detroit Medical and Library Association, January 17, Dr. Don M. Campbell read a paper entitled "Headaches." In substance he spoke as follows; The subject is far reaching and has a bearing on the two great wings of medicine, viz., surgery and internal medicine, as well as upon all the various specialties. Considered in a broad and general way the most practical division of the subject from an anatomic standpoint is to consider headache as either intra- or extracranial. In the intracranial headache the variations of the intracranial circulation and pressure are the points of pathologic importance, whereas in the extracranial varieties the variations of pressure are not of so much importance, but a consideration of the various causes of reflex irritation together with that class of constitutional maladies of the rheumatic and gouty types has especial significance. There is no absolutely fixed demarcation between these two forms as they run the one into the other along the line of the neuralgias of the trigeminus nerve. On the one hand a reflex irritation may travel along the intracranial recurrent branches of the trigeminus and be intracranial, and likewise an intracranial lesion may manifest itself by pain reflected over the extracranial branches of the same nerve. Clinically headaches are organic or inorganic; by the former being meant those cases originating in an organic extracranial lesion, viz., meningitis, cerebral tumor, cerebral abscess or tubercular infiltration, etc.; by the latter, all the reflex headaches and neuralgias and the diathetic, toxic, febrile, neurasthenic and hysteric varieties. In the latter varieties of headache the most important thing to determine is whether or not the headache be reflex in its character or whether it have its etiologic factor in a disturbance of nutrition.

THE ANNOUNCEMENT that Dr. S. P. Duffield intends to resign as Commissioner of Health for the city of Detroit will be received with deep regret by the profession. Dr. Duffield assumed the duties of his position in agitated times and has exemplified the possession of that admirable gift of carrying in his right hand, gentle peace, and has demonstrated its power to silence envious tongues. During his term of office the sani-

tary affairs of the city have been conscientiously and capably administered. Dr. Duffield will carry with him to whatever field of labor he repairs, the good will and approval of his professional friends.—*Medical Age.*

HEALTH REPORT for week ending January 15: Deaths 79, under 5 years 30. Births, male 30, female 34; contagious diseases diphtheria 17, scarlet fever 49; deaths from diphtheria 3, scarlet fever, none.

Societies.

The following meetings are noted:

California.—San Luis Obispo Medical Society, January 14.

Connecticut.—Windham County Medical Association, Hartford, January 18.

Illinois.—Brainerd District Medical Society, Mason City, January 27; Chicago Medical Society, January 26; Physicians' Club of Chicago, January 31.

Indiana.—Marion County Medical Society, Indianapolis, January 18; Montgomery County Medical Society, Crawfordsville, January 18; Purdue Pre Medical Society, Lafayette, January 14; St. Joseph County Medical Society, South Bend, January 25; Tippecanoe County Medical Society, Lafayette, January 17.

Iowa.—Blackhawk County Medical Convention, Waterloo, January 14; Council Bluffs Medical Society, Glenwood; Jasper County Medical Association, Newton, January 18; Polk County Medical Society, Des Moines, January 11; Sioux Valley Medical Association's semi-annual convention, Sioux City, January 21.

Kansas.—Golden Belt Medical Association, Solomon City, January 13; Leavenworth County Medical Society, Leavenworth, January 13.

Kentucky.—Kentucky Midland Medical Society, Shelbyville, January 13; Paducah Medical and Surgical Society, January 19.

Maine.—Maine Academy of Medicine, Portland, January 10,

Maryland.—Johns Hopkins Medical Society, Baltimore, January 18.

Massachusetts.—Hampden County Medical Association, Springfield, January 17; Hampshire County Medical Society, Springfield, January 12; Millers River Medical Society, Orange; Worcester District Medical Society, Worcester, January 12.

Minnesota.—Southwestern Minnesota Medical Association, Worthington, January 11.

Missouri.—Kansas City Academy of Medicine, January 11; St. Louis Medical Society of Missouri, St. Louis, January 22.

Nebraska.—Lincoln Medical Society, January 11.

New Hampshire.—Center District Medical Society, Concord, January 11.

New Jersey.—Burlington County Medical Society, Mount Holly, January 18.

New York.—Albany County Medical Society, Albany, January 19; Binghamton Academy of Medicine, January 18; Chenango County Medical Society, Norwich, January 11; Duchess County Medical Society, Poughkeepsie, January 12; Dunkirk and Fredonia Medical Society, Dunkirk, January 19; Elmira Academy of Medicine, January 12; Jefferson County Medical Society, Watertown, January 11; Kings County Medical Society, Brooklyn, January 18; Newburgh Bay Medical Society, Newburgh, January, 11; Oneida County Medical Society, Utica, January 11; Oneonta County Medical Society, Oneonta, January 25: Ontario County Medical Society, Canandaigua, January 11; Practitioners' Society, Rochester, January 13; Ninety-second annual meeting, of the Medical Society of the State of New York, Albany, January 25, 26 and 27; Syracuse Academy of Medicine, January 11; Wayne County Medical Society, Newark, January 18; Westchester County Medical Society, Mount Vernon, January 18.

Ohio.—Clark County Medical Society, Sandusky; Cleveland Medical Society, January 14; Dayton Academy of Medicine, January 24: Eastern Ohio Medical Association, Toronto, January 11; Lorain County Medical Association, Lorain, January 11; Lucas County Medical Society, Toledo, January 7; Mercer County Medical Society, Greenville, January 16; Muskingum County Medical Society, Zanesville, January 13; Toledo Medical Association, January 14.

Oklahoma.—Central Oklahoma Medical Association, Enid.

Pennsylvania,—Allegheny County Medical Society, Pittsburg, January 18; Beaver County Medical Society, Beaver Falls, January 13; Berks County Medical Society, Reading, January 11; Blair County Medical Society, Altoona, January 20; Bradford County Medical Society, Towanda, January 11; Cumberland County Medical Society, Carlisle, January 11; Delaware County Medical Society, Chester, January 12; Lebanon County Medical Society, Myerstown, January 11: Lehigh Valley Medical Association, Easton, January 25; Luzerne County Medical Society, Wilkesbarre, January 12; West Branch Medical Society, Sunbury, January 11.

Wisconsin.—Dodge County Medical Association, Beaver Dam, January 10; Fox River Medical Association, Green Bay, January 28.

CHANGE OF ADDRESS.

Bradford, H. W., from Boston, Mass., to 120 Paul Gore St., Jamaica Plain, Mass.
Burchard, T. H., from 53 W. 52d St. to Buckinghan Hotel, New York.
Clausen, J. J., from New Ridge Building to 501 Rialto Building, Kansas City, Mo.
Cox, G. W., from 2258 Wabash to 2945 Groveland Ave., Chicago, Ill.
Dargatz, D. G. G., from Ridge Bldg. to 4 E. 10th St., Kansas City, Mo.
Ewing, W. B., from Canonsburg to 515 Penn Ave., Pittsburg, Pa.
Furay, C. E., from Chadron, Neb., to 2237 Seward St., Omaha, Neb.
King, Thomas, from Piqua, Ohio, to West Mansfield, Ohio.
Kay, T. W., from 206 Penn Ave., to Scranton Private Hospital, Scranton, Pa.
Louis, I. C., from 354 Tremont St. to 210 Huntington Ave., Boston, Mass.
May, L. F., from 191 Fullerton Ave. to 910 Irving Park Boul., Chicago.
McBride, J. H., from Hartland, Wis. to Pasadena, Cal.
Stockton, Sarah, from 227 to 413 N. Delaware St., Indianapolis, Ind.
Woodward, J. H., from Burlington, Vt. to 58 W. 40th St., New York.
Woodward, A. P., from 21 Powell St. to 1228 Sutter St., San Francisco, Cal.

LETTERS RECEIVED.

American Therapeutic Co., New York, N. Y.; Allen, E. N., South McAlester, I. T.; American Sports Publishing Co., New York, N. Y.
Breuer, Chas. H., Hallettsville, Tex.; Bovinine Co., New York, N. Y.; Bumgarner, A. E., Piketon, Ohio; Baker, J. C., Co., Philadelphia, Pa.; Brown, Warren, Tacoma, Wash.; Benson, O. O., Keokuk, Iowa; Buland, G. L., Greenwood, Wis.; Buck, M., Philadelphia, Pa.; Bond, Abby M., Syracuse, N. Y.
Cary, R. G., Sargho, Ky.; Cleaves, Margaret A., New York, N. Y.; Curtis, W. K., Midland, Texas; Cram, C. W., (2) Davenport, Iowa.
Dewey, Richard, Wauwatosa, Wis.; Denison, Charles, Denver, Colo.
Evans, George, Columbus, Ohio; Elliott, H. G., New York, N. Y.
Frey, C. L., Scranton, Pa.
Gibbons, Henry, Jr., San Francisco, Cal.
Hummel, A. L., (2) Advertising Agency, New York, N. Y.; Humphries, W. C., Acworth, Ga.; Harrison, R. H., Columbus, Texas; Holmes, Bayard, Chicago, Ill.; Hare, H. A., Philadelphia, Pa.; Hicks, Wm., New York, N. Y.
Jones, Josiah, Evanston, Ill.; Jones, Hamilton P., New Orleans, La.; Justice, J. D., (2) Quincy, Ill.
Kellar, J. M., Hot Springs, Ark.; Keech, J. S., Racine, Wis.; Kup-Scheerer Co., The, New York, N. Y.
Lewis, G. Massillon, Vernon, N. Y.
Moore, Wm. M., Metuchen, N. J.; Marks, A. A., New York, N. Y.; McClellan, E. S., Saranac Lake, N. Y.; Mulford, H. K., Co., Philadelphia, Pa.; Maxey, Ed E., Caldwell, Idaho; Maltine, The, Co. Brooklyn, N. Y.
Nice, D. D., Bowen, Ill.
Polk, R. L., & Co., Detroit, Mich.; Prather, D. J., Los Angeles, Cal.; Preston, C. H., Davenport, Iowa; Peirce. D. B., Indian Mound, La.
Rohe, George H., Baltimore, Md.; Rogers, W. B., Memphis, Tenn.; Reynolds, Dudley S., Louisville, Ky.
Saunders, W. B., Philadelphia, Pa.; Smith, R. Walter, Clarkson, Texas; Sayre, Reginald H., New York, N. Y.; Scheppegrell, W., New Orleans, La.; Seal, I. N., Hackleman, Ind.; Sternberg, George M., Washington, D. C.; Smith, E. B., Detroit, Mich.; Stearns, F., & Co., New York, N. Y.; Swasey, George B., Portland, Me.; Spaulding, Warren C., New York.
Talbot, E. S., Chicago, Ill.
Verbryck, G. G., Cambria, Wyo.
Welch, Wm. H., Baltimore, Md.; Wilson, J. T., Sherman, Texas; Woodward, J. H., New York, N. Y.; Whalen, Chas. J., Chicago, Ill.; Wheeler, F. B., Dows, Iowa; Wall, Charles D., Columbus, Ga.

THE PUBLIC SERVICE.

Notice.—An Army Medical Board will be in session at Washington City, D. C., during the month of May, for the examination of candidates for appointment to the Medical Corps of the United States Army, to fill existing vacancies.

Persons desiring to present themselves for examination by the Board will make application to the Secretary of War, before April 15, 1898, for the necessary invitation, giving the date and place of birth, the place and State of permanent residence, the fact of American citizenship, the name of the medical college from which they were graduated, and a record of service in hospital, if any, from the authorities thereof. The application should be accompanied by certificates based on personal acquaintance, from at least two reputable persons, as to his citizenship, character and habits. The candidate must be between 22 and 29 years of age, and a graduate from a Regular Medical College, as evidence of which, his Diploma must be submitted to the Board.

Successful candidates at the coming examination will be given a course of instruction at the next session of the Army Medical School, beginning in November, 1898.

Further information regarding the examinations may be obtained by addressing the Surgeon-General, U. S. Army, Washington, D. C.

GEO. M. STERNBERG,
Surgeon-General, U. S. Army.

Army Changes. Official List of Changes in the Stations and duties of officers serving in the Medical Department, U. S. Army, from January 8 to 14, 1898.

First Lieut. Irving W. Band, Asst. Surgeon, is relieved from duty at Ft. Huachuca, Ariz., and ordered to Ft. Du Chesne, Utah, for duty.

First Lieut. Charles E. D. Flagg, Asst. Surgeon, is relieved from duty at Ft. Du Chesne, Utah, and ordered to Columbus Bks. Ohio, for duty.

Capt. H. C. Fisher, Asst. Surgeon, is granted three months and two days' leave, to take effect on or about Feb. 1, 1898.

Capt. Henry A. Shaw, Asst. Surgeon, will report in person at Ft. Crook, Neb., for temporary duty at that post, and upon the arrival there of First Lieut. Deane C. Howard, will return to his proper station at Ft. Snelling, Minn.